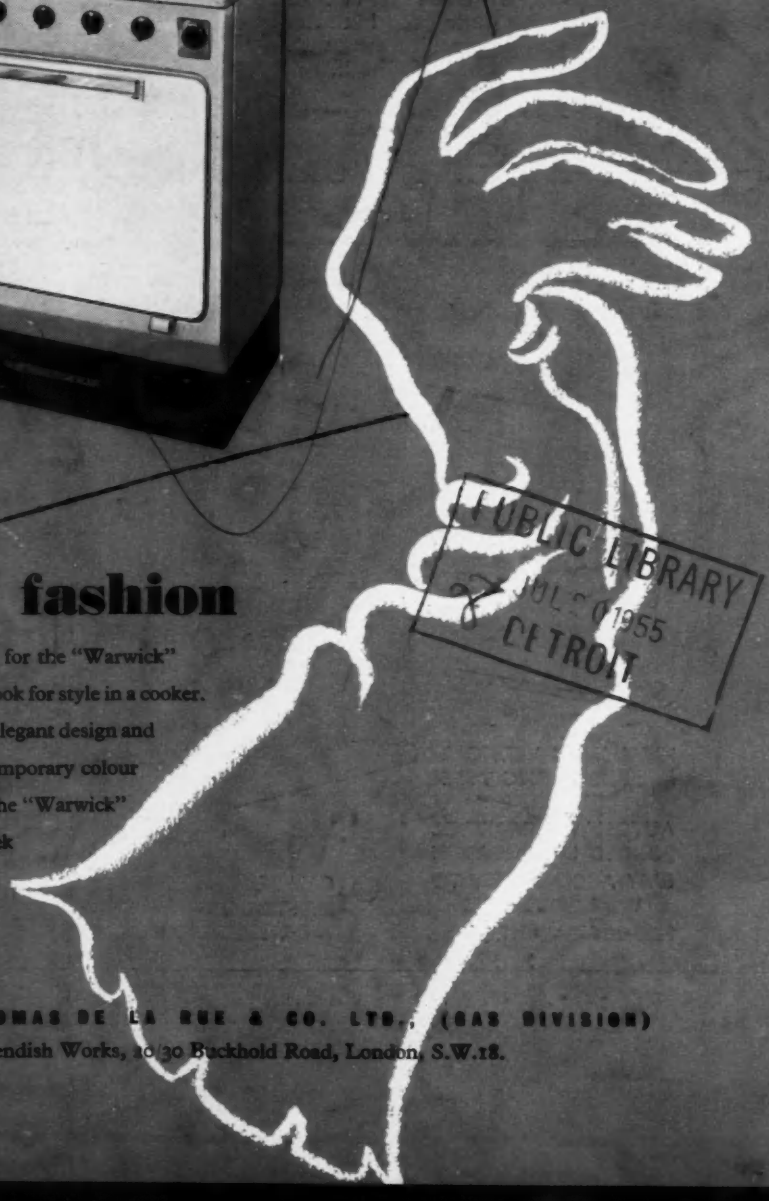
Gas Journal

VOL. 282. 107th YEAR. LONDON, JUNE 29, 1955. No 4804. PRICE 1/3

TECHNOLOGY DEPT.



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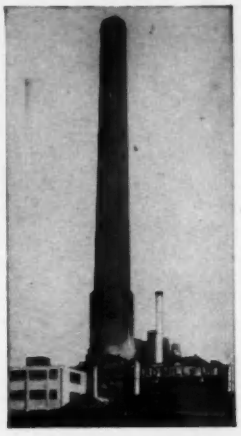
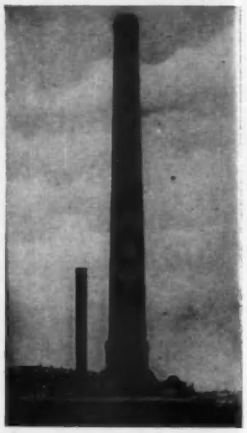
Left : Trial borings for reconstruction of Coventry Cathedral.





Two of the largest chimneys in the British Isles; on foundations of Francois Concrete Piles (left) and Francois Cementation Piles (Right)

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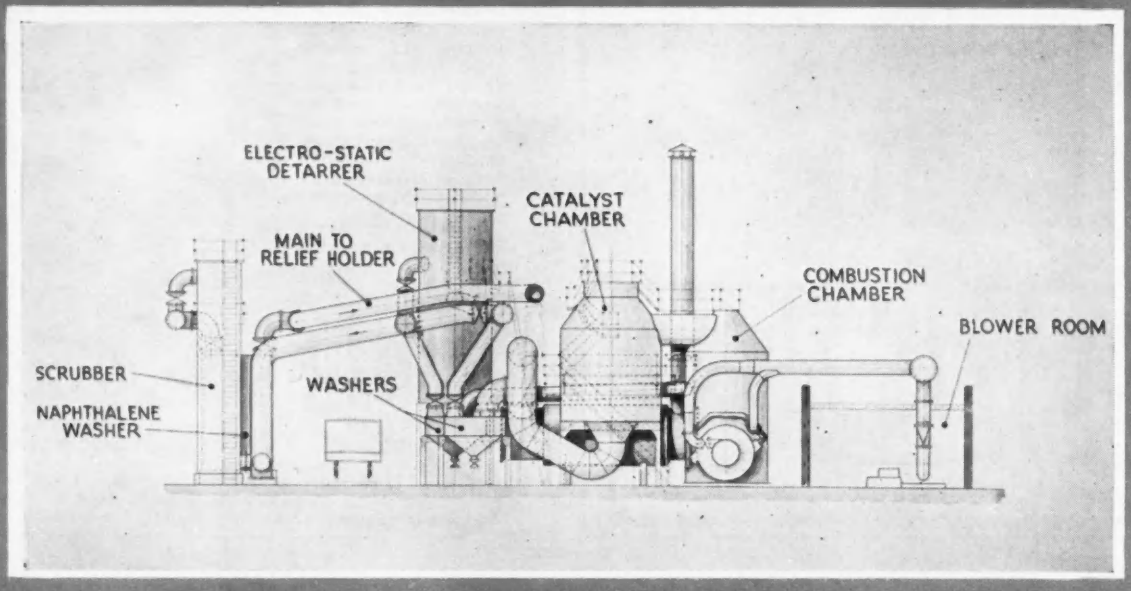

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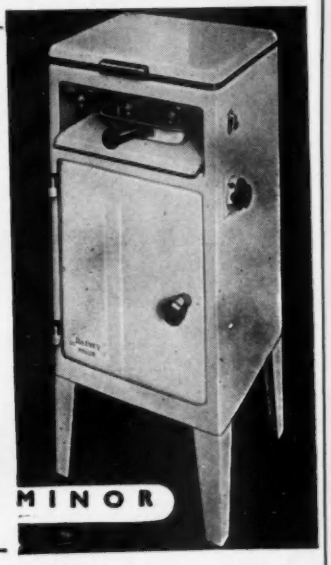

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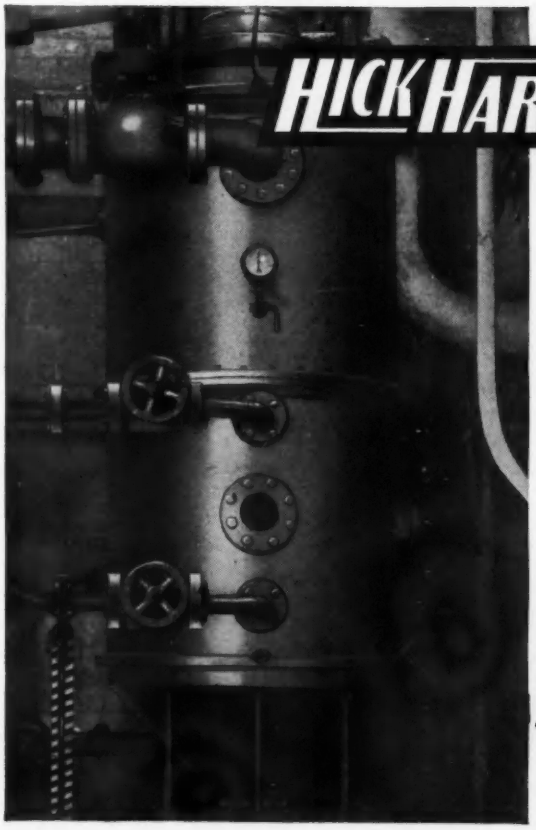

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H127A

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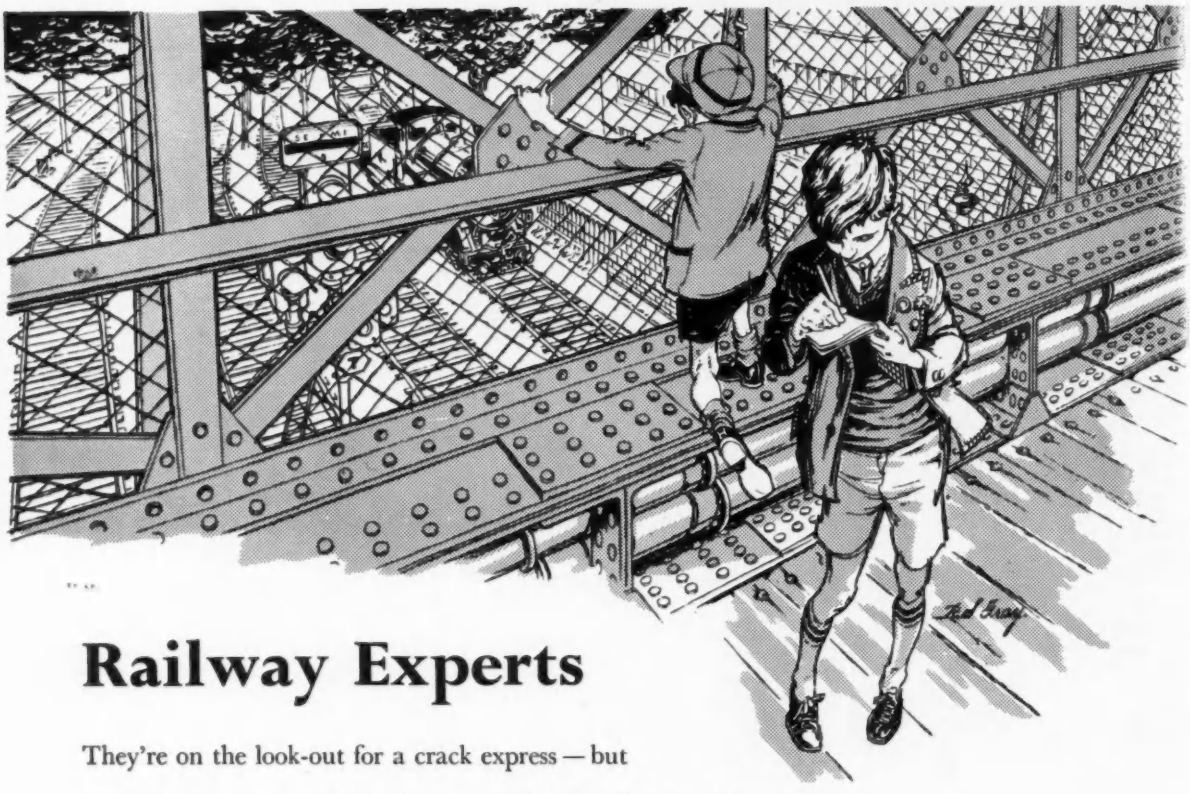

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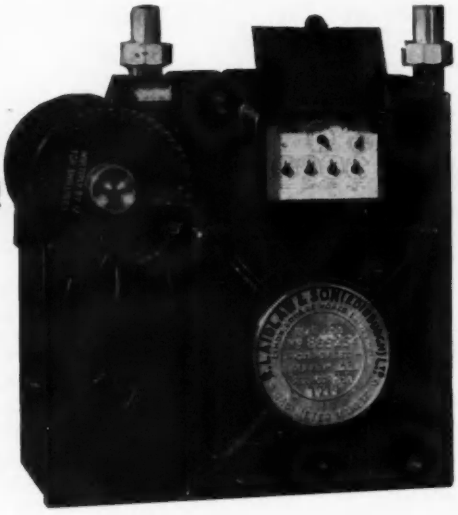

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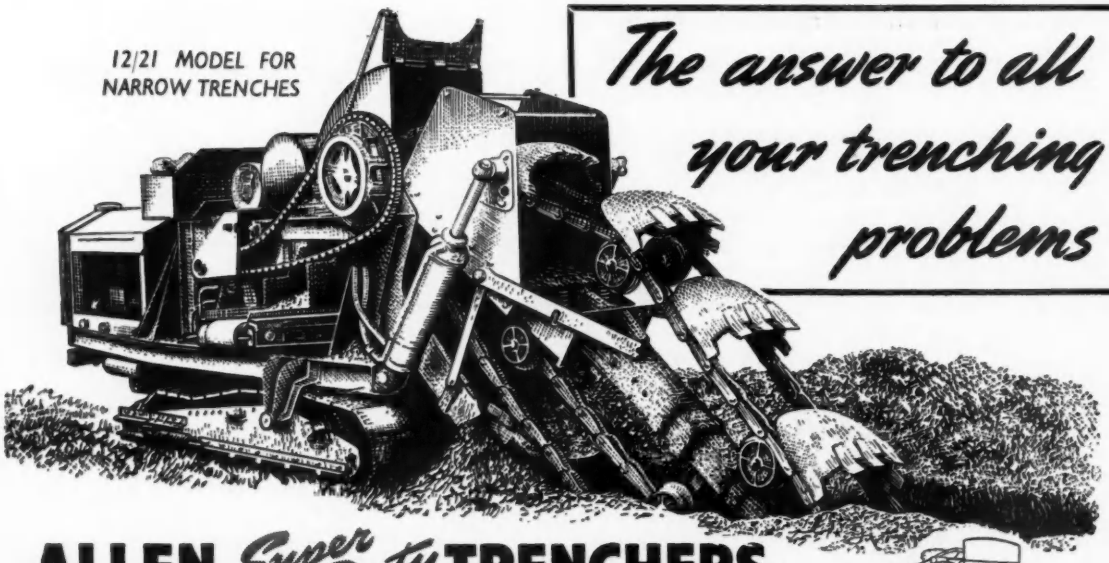

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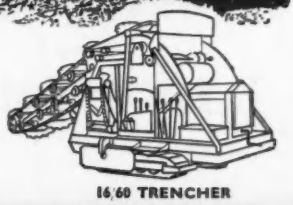

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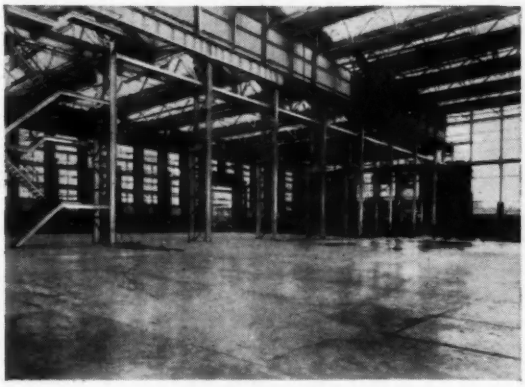

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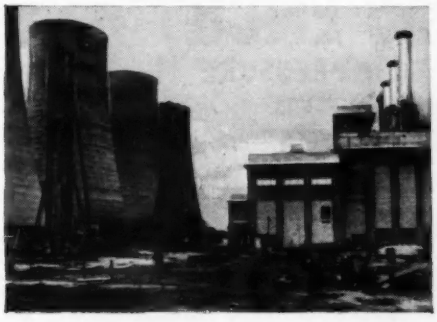

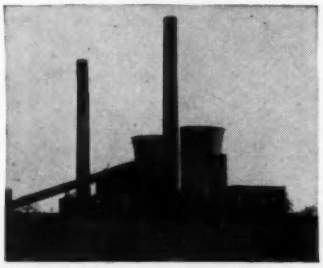

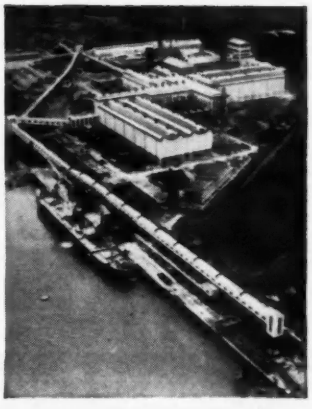

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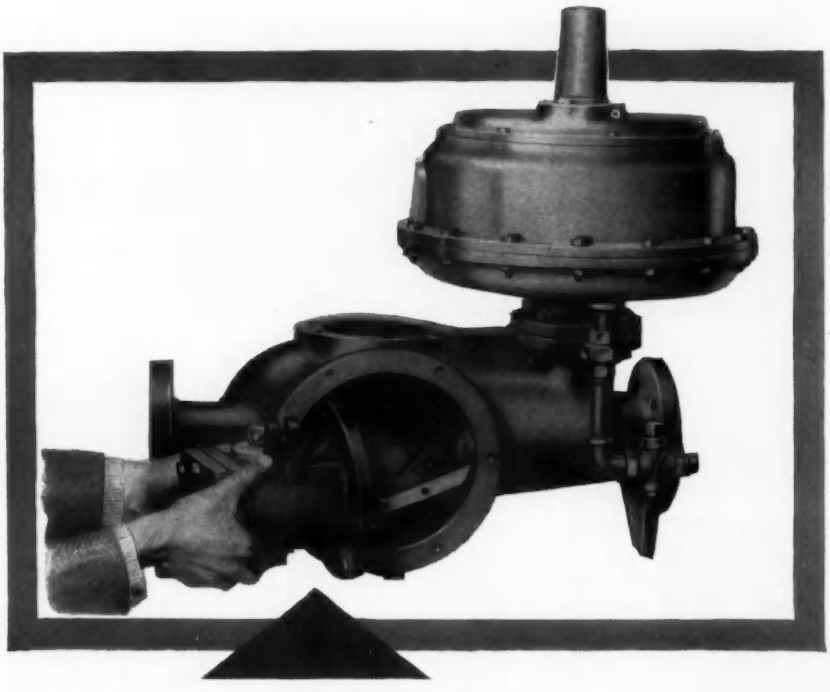

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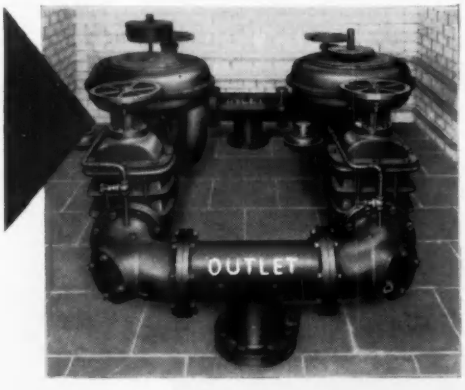

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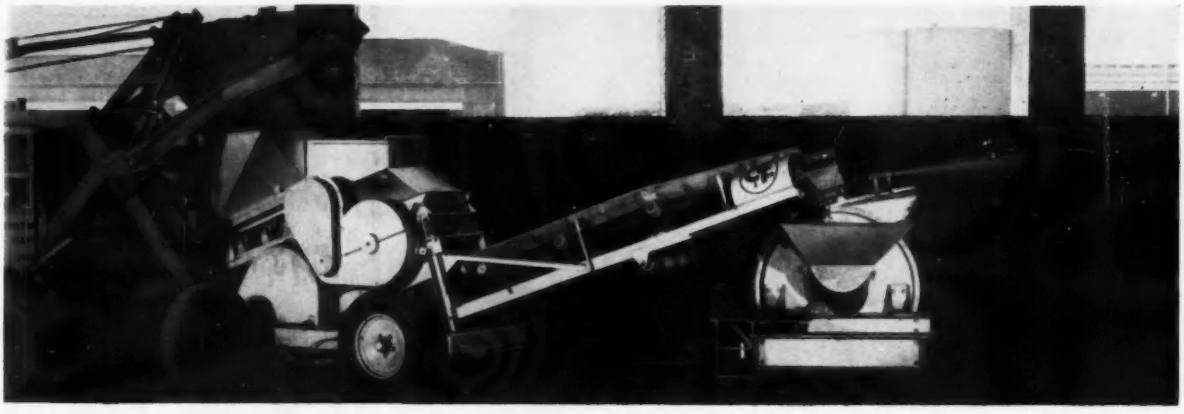

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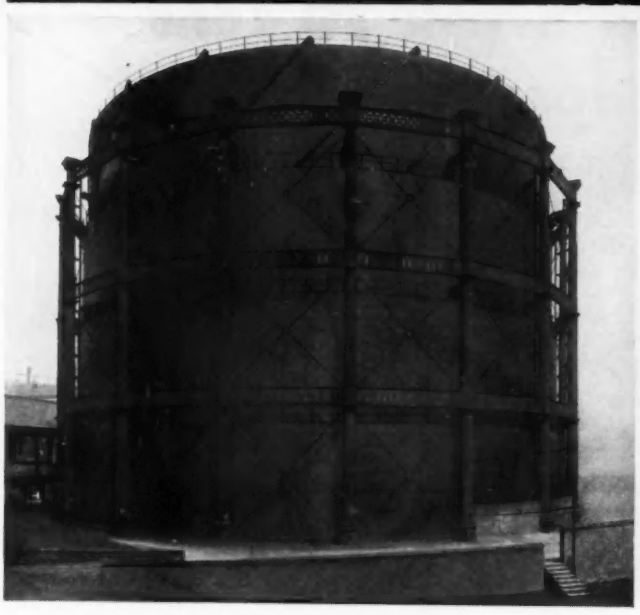

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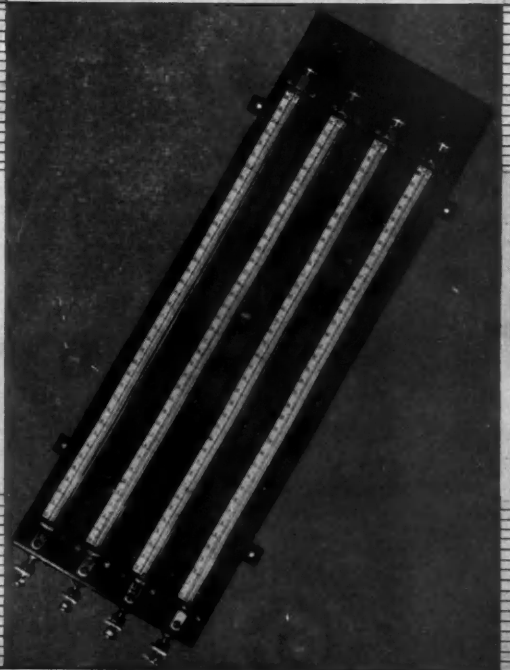

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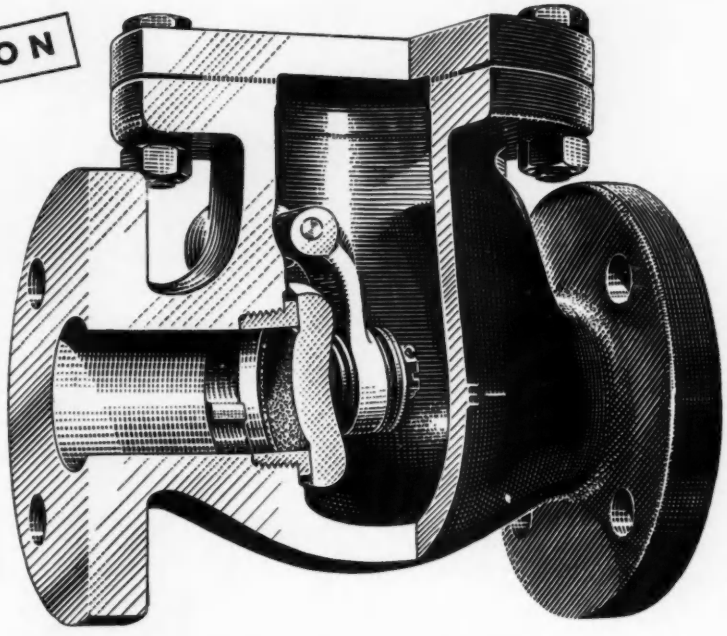

—with flexible disc-hinge connection!

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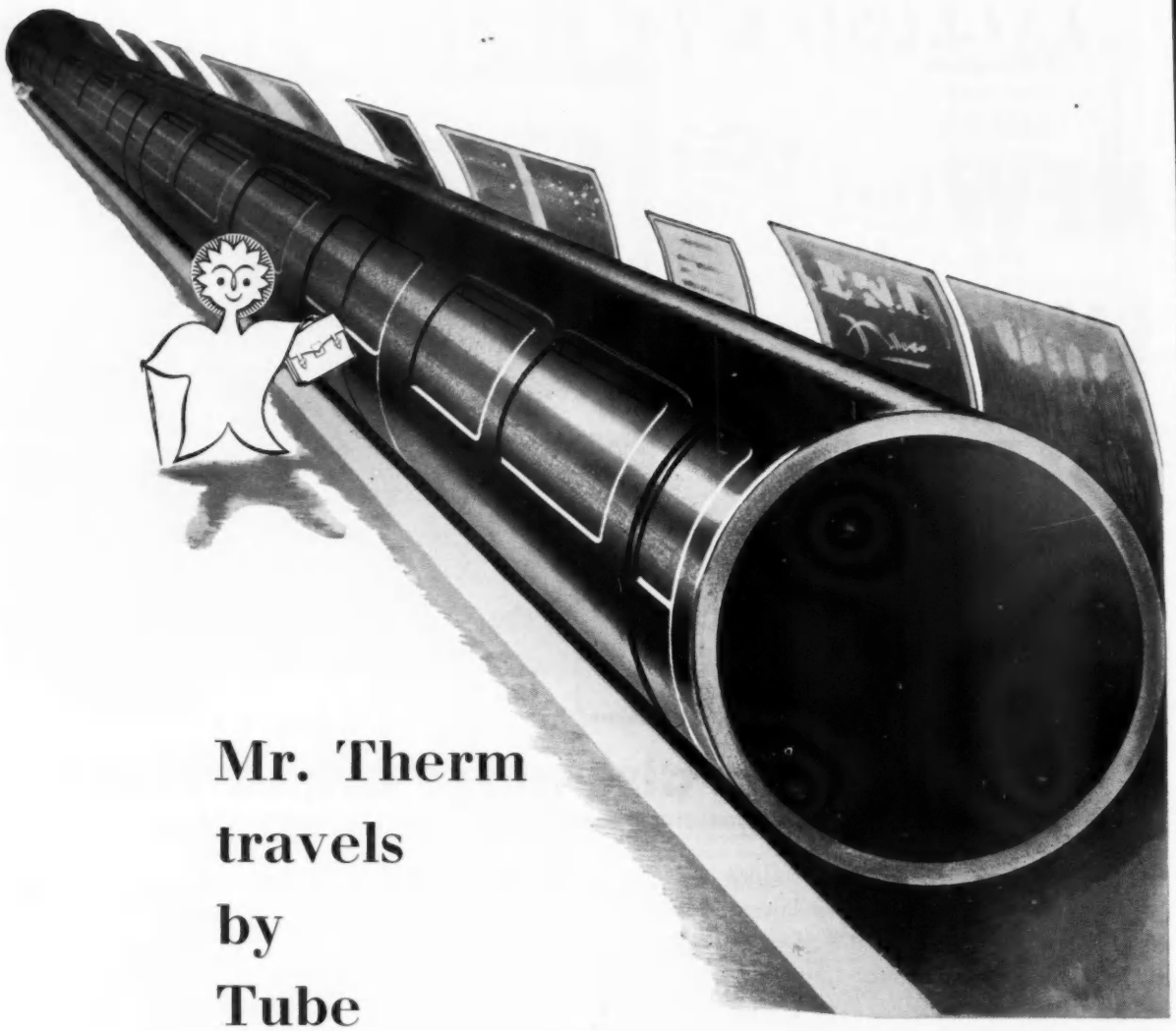

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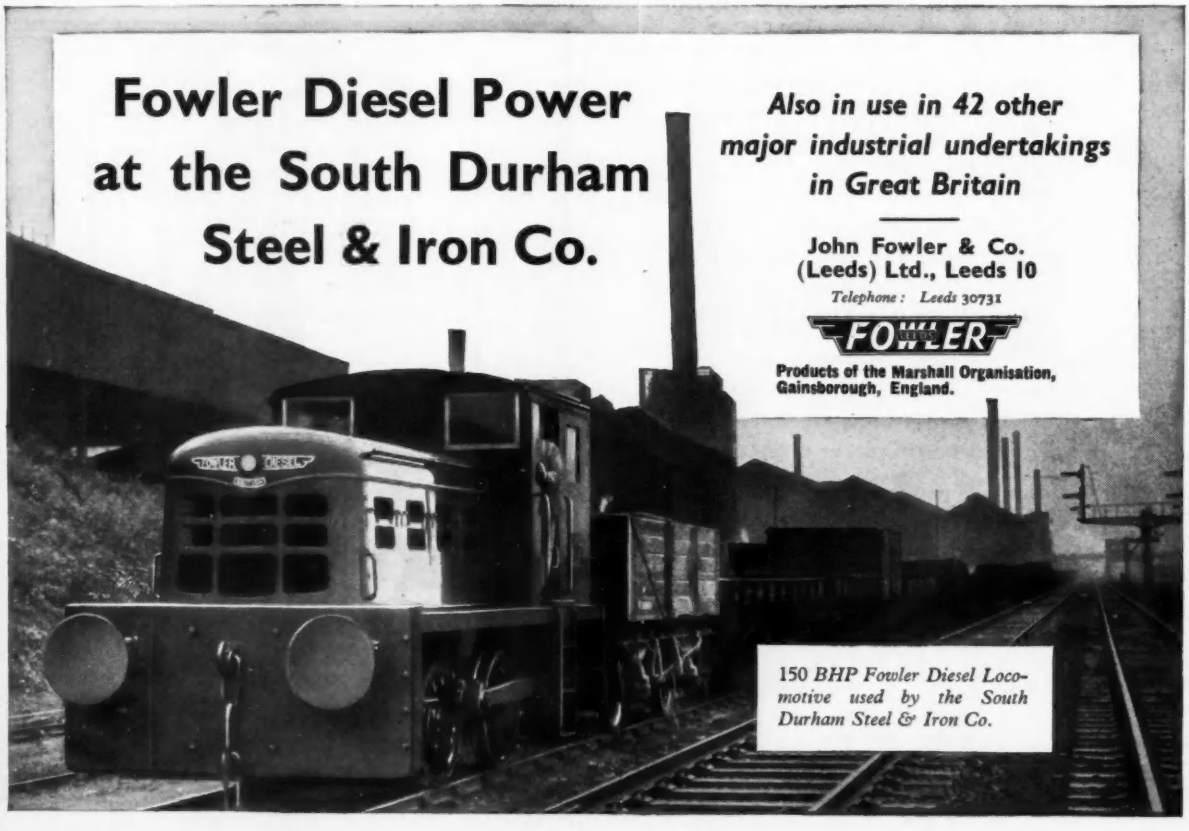
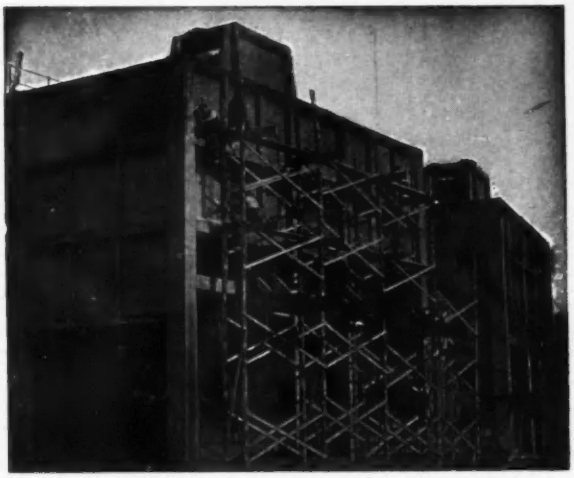


150 BHP Fowler Diesel Locomotive used by the South Durham Steel & Iron Co.

Gunite



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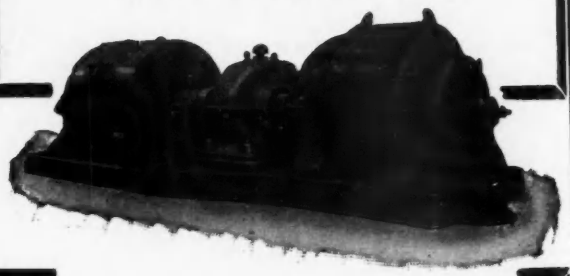

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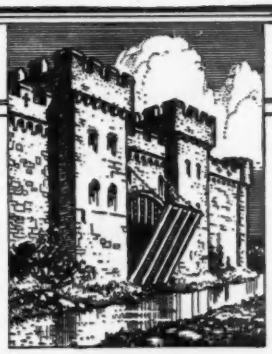

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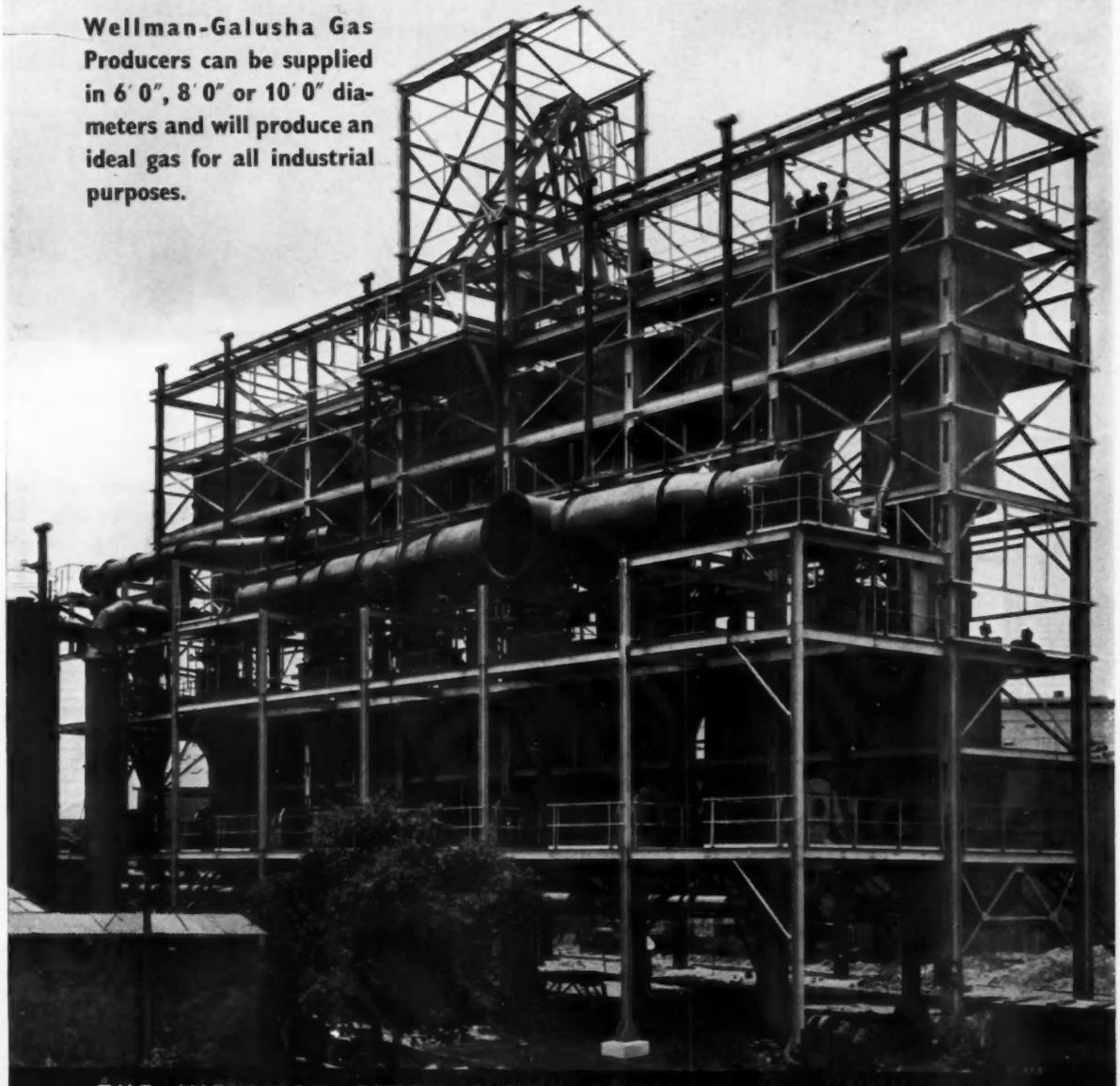

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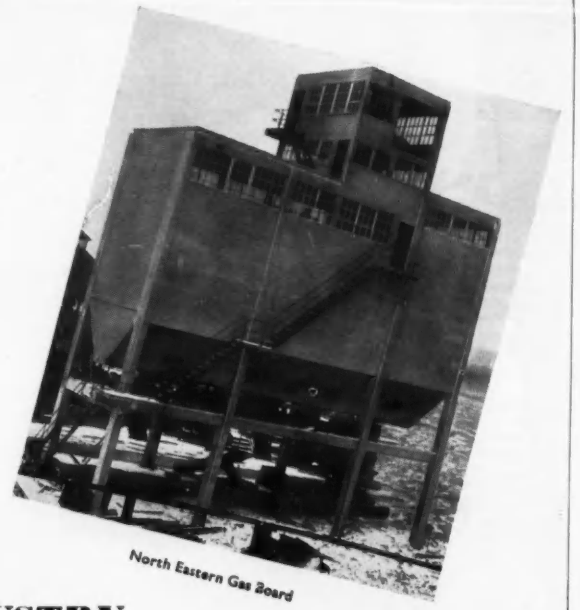

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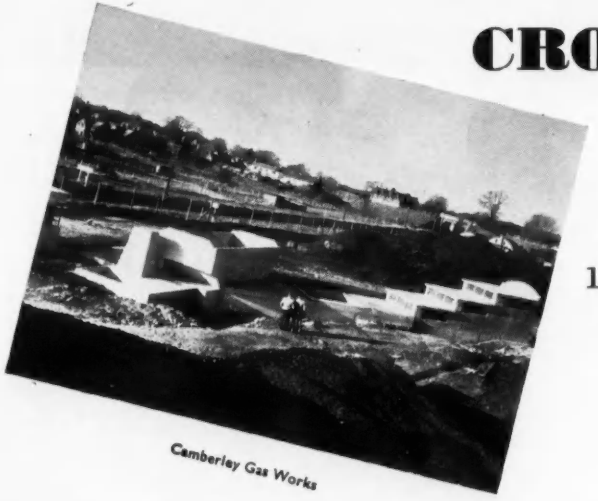

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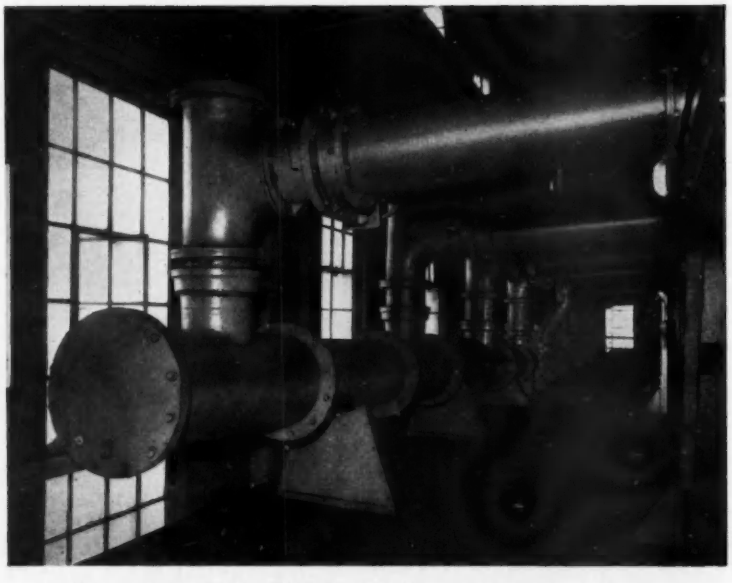

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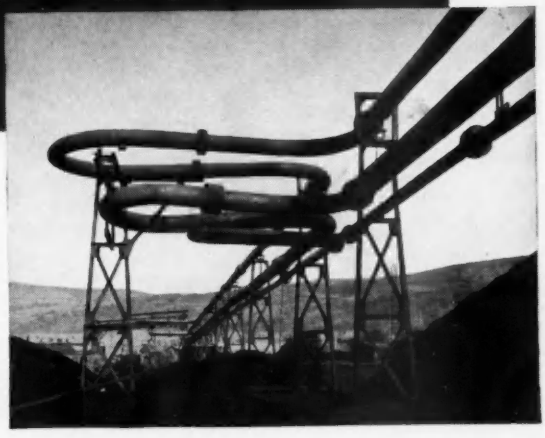

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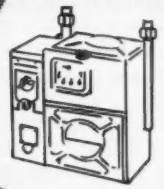

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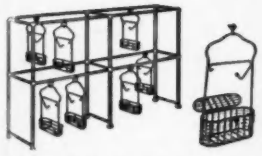

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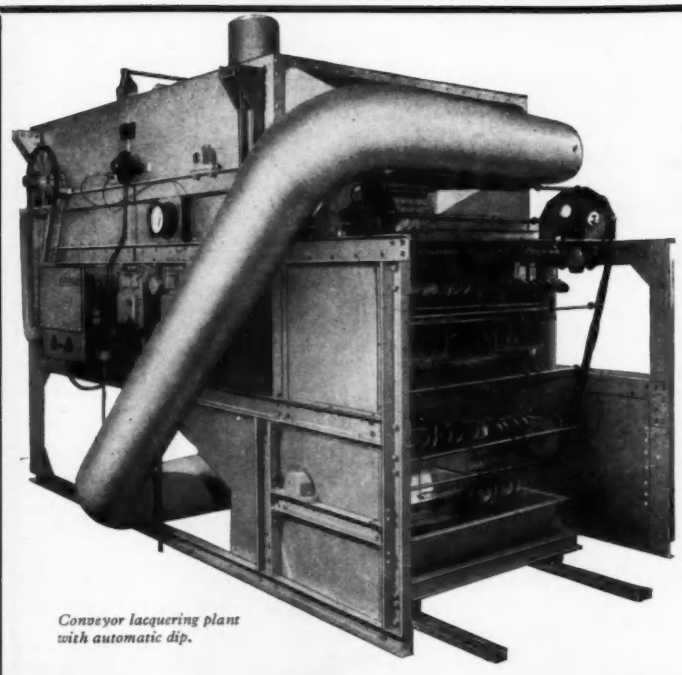

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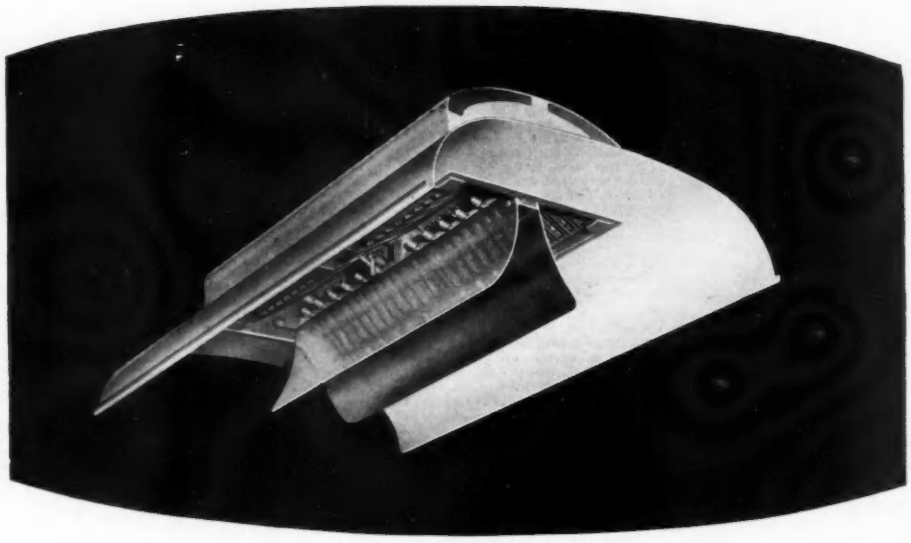

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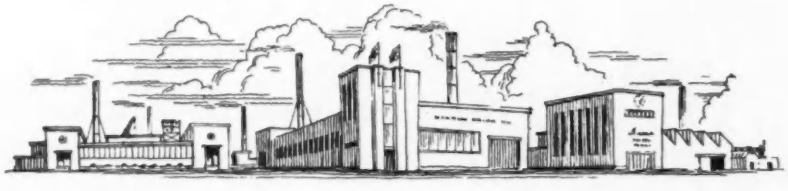

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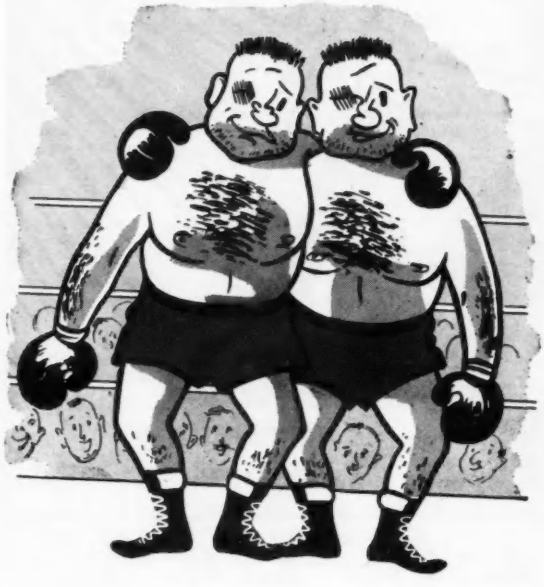

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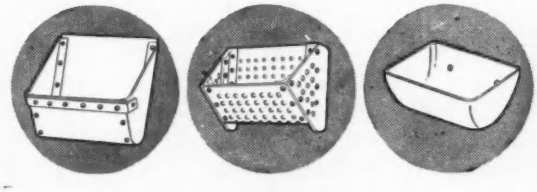

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Gas Journal

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107TH YEAR

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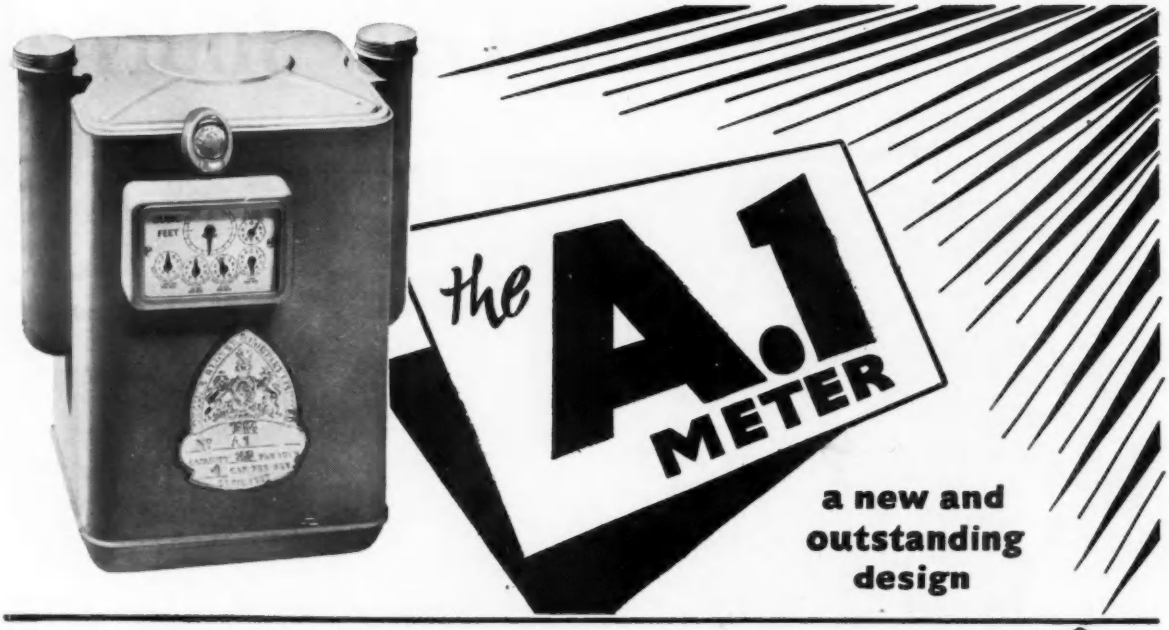

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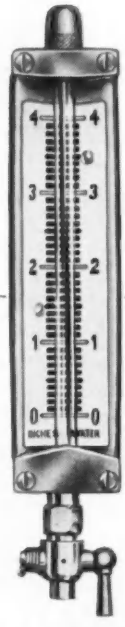

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Gas Journal

VOLUME 282. No. 4803. JUNE 22, 1955. 107th YEAR

'Failing Coal'

COMMENT in the more responsible daily Press on fuel problems is always interesting because it reveals the general attitude of the ruling classes. One can discern there what, if any, is likely to be the national policy in these matters. The annual report of the National Coal Board for 1954 received a good deal of attention. *The Times* opened with the sentence, 'It is going to be difficult to ensure that supplies of heat and power keep pace with growth, at least until atomic power is available in large quantities.' The record of coal production is so dismal, the prospects of a substantial increase in annual output are so remote, that it is no wonder that longing eyes are strained on the coming of the atomic age. There seems to be no realization at all that the real atomic age is not yet more than dimly in sight; we mean the age when atomic energy will be directly transmutable into usable power without the intervention of the steam cycle. It has not yet been realized that what we have in the grandiose schemes for atomic power stations now to be put in hand are merely waste heat recovery plant from a process whose economic future is still not very clear. And even if the promised increases of coal output were realized they would do no more than hold the growth of industrial demand until these schemes are accomplished.

'So far this year,' says the *Manchester Guardian*, 'we have mined about 2 mill. tons less coal than in the first half of last year—a net loss in terms of coal as well as money on the £84.7 mill. spent by the Board last year on capital account.' Surely it is the depth of despair to go on to say that even if this money 'had been spent directly on importing coal, it would have brought far more coal than investment in our own mines seems likely to yield.' Very little is said or even suggested about the pressing need for even greater coal economy in utilization. True, *The Times* does admit that 'Britain still consumes a surprisingly large tonnage of large coals for locomotives and for domestic fires.' But there is nothing about the wastage of carbonization coals in direct combustion—nothing about what the President of the Institution of Gas Engineers recently described as the 'more selective use of coals suitable for carbonization.' There is, however, an incidental reference to the increasing supply of small coals arising out of the advance of mechanical coal-getting, the 'continuous miner' on which America is said to be relying. And this sentence should be noted: 'The new smokeless fuels for domestic use will be made from small coal, and in the future the market for coal is likely to become predominantly, even exclusively, a market for small coal, possibly used mainly near the mines.'

Are we to take this as another hint that the National Coal Board intends to take a hand in the solid smokeless fuel market, 'an activity,' as Mr. Tate put it, 'to which the National Coal Board is devoting such (much?) energy at the present time.' And it must be admitted that the gas industry is in a terribly difficult position in this very direction. Indeed the passage in the Presidential Address which examined 'to what extent the gas industry can meet a demand for smokeless domestic fuels,' will be studied with great care, for this demand 'is estimated to rise to a total of some 15 mill. tons per annum in the so-called black areas alone'—a figure to be compared with a total production for sale, in the latest published returns, of 10.6 mill. tons.

Mr. Tate tabulated five ways in which present practice could be modified to increase the amount of coke from the gasworks available for sale. With the use of oil gas instead of water gas to meet peak loads there will be no disagreement, though it will to some extent increase our dependence on imported oil. The withdrawal of gas coke from industry and its replacement by low volatile coal or hard coke should present little technical difficulty. The withdrawal of coke from export makes a small contribution, but should be considered. It is when we come to modification of retort house technique that controversy begins. Every suggestion so far seems to entail an increased cost of gas manufacture. We have Dr. Burns' word for it, if it were really in dispute, that coal steamed to the appropriate calorific value makes gas in vertical retorts fired by coke-fed integral step grate producers at the lowest cost so far. To replace producer coke by low grade, low volatile coal seems an obvious way of conserving coke for sale. But the fuel gas would need to be cooled, washed and probably re-heated at a considerably increased cost. And the proposal to raise the declared calorific value by a sufficient amount—and we doubt whether an increase of 50 B.Th.U. all round would be sufficient to make a great difference—would undoubtedly increase the cost of gas into holders. There is a particular calorific value at which gas can be made in vertical retorts, different for each type of coal, at

which costs are at the minimum. It has been more than once maintained that this value should be ascertained and adhered to. Fuel consumption has, in modern plants, been substantially reduced. Perhaps the modernization of plants past their prime might make a considerable addition to the amount of coke for sale. And the further use of the recuperator, perhaps the metallic recuperator, appears to be worth investigation.

It is difficult indeed to see how the demand for coke can be met if we are to 'move away from carbonization.' None of the radical departures from existing retort house practice at present in sight promises a reduction in manufacturing costs. Nor do we agree that the cost of the inevitably necessary new plant to meet this need is quite prohibitive. These are surely counsels of despair. Costs of gasworks plant are no higher, in proportion, than those of any similar industrial apparatus. And if progress is to be halted because of the monetary cost of new equipment then the future is dark indeed. If capital expenditure can earn its keep, it should be embarked upon with courage, albeit with prudence too. But, after all, the great problem before the gas industry is that of balancing gas and coke consumption. Only an overriding national policy would seem to be capable of doing this, backed by tariffs and sales efforts to secure increased sales of gas. The gas industry can claim with justice that in the domestic field at least, household services can be provided at the minimum of coal cost, and if fairly assessed at monetary cost, by a judicious combination of gas and coke.

The *Manchester Guardian* strikes the proper note of urgency when it mentions 'the need for a radical revision of present policies.' Instead of planning to spend huge sums of money on optimistic forecasts of future productivity' in the coalfields, 'should we not rather begin to budget seriously for failing coal production—not in some vague period a generation or so ahead, but now?' The *Guardian*, too, pins its hopes on the coming atomic age, but all will agree with its final dictum, 'An agonizing re-appraisal of the coal industry may be a painful process, but it will be more painful if it is not made now?'

The 'Static' Vertical

THE 'static' vertical retort of Woodall-Duckham's patent design is an interesting example of the 'enclosed intermittent verticals' as they were described in *King's Manual*. It is well to recall what Grogono and Finlayson said in their Croydon paper. It amounts to this. In the continuous vertical, steaming is continuous and counter current to the continuous flow of coal. The quality of the water gas is constant. The descending cold coal charge meets the rising stream of hot coal gas and water gas resulting in the production of low temperature distillation products, leading to an increased tar yield and a reduced yield of coal gas therms. In the standard intermittent vertical retort steaming follows the carbonization of the stationary charge. The quality of the water gas tends to fall, but 'on the other hand, the stationary charge gives less tendency for production of low temperature distillation products from the coal.' There is generally a higher thermal yield in intermittent than in continuous verticals. 'In static vertical retorts the best features of both these methods are combined.' Steaming is continuous and good quality water gas is made. The production of low temperature distillation is avoided. 'The continuous passage of water gas and uncracked steam around or through the hot stationary coal charge leads to enrichment of the water gas.'

Of the two main systems on this principle which have been given extended trial it appears that only those by the Woodall-Duckham Company at Cambridge and Southampton have survived. The reasons which are generally accepted for their comparative and regrettable failure are high capital cost and particularly high maintenance costs. These are to some extent borne out in the paper presented to the Institution of Gas Engineers' Annual Meeting by Messrs. Burgess and Neil, but apart from that, the technical results and the detailed account of their experience with the plants at Southampton are extremely interesting and instructive. They may very well be compared with those reported on the 'Westvertical' plant at St. Albans by Mr. Battersby in 1939. Thermal yield per ton of coal in both types realized expectations based on Croydon; it is a little better than what is generally obtained in the standard intermittent. The quantity of coke for sale was spoiled by an unusually high fuel consumption in producers. Clearly, in this system, the recovery of residual heat from the coke does not make up for the absence of that from waste gases in the recuperator.

We are told incidentally that the 'carrier gas' technique was tried in one retort, though for a reason different from the usual one—to eliminate water gas production within the retort so that slag erosion might be reduced. It is of interest to note that while cooling of the coke was accomplished during the 10-hour cycle, so that this could be maintained, 'no reduction in the charging cycle could be obtained—the spectacular results obtained in continuous vertical retorts were not realized.'

There were perfectly good reasons why recuperators were not built with the settings at Southampton; nor were they at Cambridge or St. Albans. Indeed, in this respect, the system followed the example of the continuous vertical where low fuel consumptions are achieved without them. But it was interesting to hear from Mr. Winch that recuperators have since been added to the 'static' settings at Cambridge. The difficulty at Southampton was the room required for the standard brickwork recuperator. A metallic recuperator was added to the 'Westverticals' of one installation with some success. It is possible that this idea might be studied further for both 'statics' and continuous verticals. The problem is to find a metal which will stand up to 1,000°C. in gases with an appreciable sulphur content.

In his presentation of the paper Mr. Burgess pinpointed the two problems which still remain to be solved before comfortable working conditions can be attained—the construction of the cooling chamber and the avoidance or substantial reduction of slagging erosion at the base of the retort. It is curious that no comparable difficulty with the retort was reported from St. Albans. Mr. Winch reported the same erosion trouble at Cambridge. His details of results there added something to the value of the paper and the study of the subject. It was particularly significant that the

addition of recuperators has reduced fuel consumption by 1.5 cwt. per ton of coal carbonized. This is 7½%, and if the original was a little over 20% it would produce a figure of around 13%, which would be very good indeed.

Mr. Finlayson's contribution to the discussion was most entertaining. He said that he and his designers had been criticized in three of this meeting's papers, but his fears that he might be required to return the medal he so richly earned for his Croydon paper are quite groundless. Mr. Whitehead, who was responsible for the installation of the Southampton plant, has no regrets. 'The test results indicate the soundness of the basic principles underlying the static retort.' It certainly appears to be a system worth further development. It solves, for the intermittent vertical, the problem of the nuisance arising from the quenching of hot coke, a further solution of which might well be pursued in the combination of some form of dry quenching in an enclosed vessel with the standard intermittent vertical. Mr. Whitehead was of the opinion that this system 'will in due course be reconsidered—particularly when the blending of coals becomes important.' In this connection it is interesting to recall that in one installation of the other similar system, blending was carried out, with conspicuous success, so far as to include something like 10% of pulverized breeze, producing a particularly close grained coke for a special purpose. The adventures at Southampton are not only, as Mr. Finlayson rightly claimed, in the tradition of co-operation between builders and operators. They are an example of dogged perseverance almost without parallel. One might well be daunted by a cost of three shillings per ton of coal for maintenance. It was, we believe, mainly for this reason that the installation at St. Albans and the others of the same type had been abandoned. Mr. Finlayson added: 'The most economic method of carbonization to deliver cool coke is, of course, the continuous vertical retort; but it is at least debatable whether the combination of the normal intermittent vertical chamber plant and a separate dry coke cooling plant would have given as good overall results as those described in this paper.' There is nothing wrong in principle with the static vertical. The problems so frankly discussed in the paper may well be ultimately solved.

JOHN BULL AT WATSON HOUSE

TO the Technical Press, and indeed to many people in the gas industry, Watson House is more than just a name and a reputation. Many have visited its laboratories and are more or less conversant with the type of work undertaken. For many years it was the testing establishment of the Gas Light and Coke Company, and provided an additional service for many other gas companies. Today it is the official research and testing centre of the Gas Council. Its change of 'ownership' has made little difference to the nature of its work, and to the gas engineer and the gas salesman it is an accepted and respected part of the gas industry's organization. It is all the more interesting, therefore, to study the reactions of an outsider coming to Watson House (one assumes) for the first time. Rex Grizell has written an article in a recent issue of *John Bull* entitled 'Watson House Brings Cooking up to Date.' The writer's object is to show housewives just how much care goes into the design and testing of her gas cooker, and he is concerned not with burner efficiencies or enamel failure but with the general picture presented by the cooker laboratory and its high priest, Mr. E. W. B. Dunning.

We have no doubt that in some ways the gas industry reader will find the article of more interest than will the ordinary man in the street. We are prepared to bet that even gas people who know Mr. Dunning quite well did not know that the initial 'B' stood for 'Bee,' or that his laboratory staff have nicknamed him 'Father.' Presumably Mr. Dunning exhibits a paternal quality, but this is something which must be reserved for his colleagues. To us he is essentially a scientist of quite outstanding ability and inventiveness. More than any other man he has been responsible for the refinements of the modern cooker and its unfailingly high standard. Some of his remarks quoted in the article are of interest. For example, he maintains that 'housewives can be divided into two classes—those who want their cookers to look clean and those who want them to *be* clean. A gas cooker,' he maintains, 'is a precision instrument, and an alteration of a fiftieth of an inch in the oven backplate can affect efficiency. . . . But for cost we could make a cooker do almost anything. It could be made to cook a meal without attention and call out "Dinner's ready" when it had finished.' We discover that Mrs. Dunning has had to try 12 different cookers in the past few years, and manufacturers will be fascinated to learn that at Watson House it takes at least six weeks to complete the tests on each cooker. Manufacturers who sometimes complain about months of waiting now know better!

The article is well-written and amusing. It instances some of the odd causes of failure, such as the dead mouse found in the burner tube, the oven burners put in upside down, and although this can hardly be termed amusing, the member of an Oriental religious sect who was gassed while preparing a ceremonial bath as the sun rose by heating the water in a tin vessel with a rim which fitted flush on top of the cooker and stifled the flames. An article discussing means whereby the safety of gas installations and appliances can be improved, written by the Editor of *Gas Service* and published in the April issue of that journal, referred at some length to ways in which reliable auomatic ignition can be effected and the burners either kept alight under all conditions or, in the event of being extinguished, the gas supply automatically cut off. In view of the recent publicity given to gas fatalities it is pleasing to note that reference has been made by Mr. Grizell to this development work. This is the type of publicity which is needed by the industry, since it emphasizes the seriousness with which the industry faces its responsibilities. Well illustrated by photographs of the laboratory and of Miss Joy Houghton in the test kitchen, the article must be regarded as one of the best plugs for gas we have had for a long time.

ATOMIC POWER PLANTS

Mr. Geoffrey Lloyd, Minister of Fuel and Power, told the House of Commons on June 13 that the actual work of designing the nuclear energy power stations for which firms would have to quote to the Central Electricity Authority would take place by the second quarter of 1956, and the actual start of the physical work would be made in the first half of 1956. Rather different considerations entered into the choice of sites for atomic power stations than entered into that for the ordinary power stations. They had no need to be near the coalfields, but they did need large quantities of cooling water. That was why coastal sites and sites on rivers were likely to prove the most suitable. Six more reactors designed to produce fissile material for military purposes as well as electricity of the same type as the two now being constructed at Calder Hall, were to be built.

Personal Notes

MR. P. J. BUNKER is resigning from his post as Chief Instructor, Area Training Centre, East Midlands Gas Board, to join the lecturing staff of the Department of Building, Sheffield College of Commerce and Technology.

DR. A. PARKER, C.B.E., Director of the Fuel Research Station at Greenwich, who has been described as 'the directing genius behind Britain's anti-smog campaign,' has been elected Chairman of the Council of the Royal Sanitary Institute.

MR. H. STANIFORTH, Chief Draughtsman and Deputy Constructional Engineer, Birmingham, has been appointed by the West Midlands Gas Board as Divisional Constructional Engineer, Birmingham District. Other West Midlands appointments announced include those of MR. W. E. DOBSON (Assistant Engineer, Nechells Works) as Deputy Works Engineer, Swan Village Works, and MR. J. BATES (Deputy Engineer and Manager, Redditch) as Group Engineer and Manager, Redditch Group.

MR. W. K. TATE, M.A., M.INST.GAS E., Immediate Past President of the Institution of Gas Engineers, will, as already announced, be joining the Board of Thomas Glover & Co., Ltd., on July 1 as Managing Director, and will also join the Board of the parent Company, Glover & Main, Ltd. Mr. Tate was born in 1909 and was educated at Westminster School and Cambridge University, where he obtained a Mechanical Sciences Tripos. His B.A. was converted to M.A. in June, 1935. In 1931 he was appointed a pupil engineer of Thomas Hardie, himself a Past President of the Institution of Gas Engineers and Chief Engineer of the Gas Light and Coke Company. After a period as Assistant Engineer at Beckton, Mr. Tate joined the Sheppey Gas Company in 1935 as Assistant Engineer and Manager, and became Engineer and Manager in 1937. In 1939 he was appointed Distribution Engineer of the Wandsworth and District Gas Company and remained throughout the war, during which period he undertook the additional duties of Transport Manager and Sales Manager. In 1946 he became General Manager of the Portsmouth, Gosport, and Bognor Regis Gas Company and on nationalisation was appointed General Manager of the Eastern Division of the Southern Gas Board. During the war years, Mr. Tate was Secretary of the London Regional Gas Engineering Advisory Board and he has served on the Council of the Institution of Gas Engineers since 1949. It is also announced by Glover & Main, Ltd., that MR. A. G. BAZELL, A.C.A., has been appointed to the Board of that Company and to the Boards of the principal trading companies as Financial Director, with effect from July 1. Mr. Bazell, who was admitted as a member of the Institute of Chartered Accountants in 1937, joined Glover & Main, Ltd., in March, 1947, and became Chief Accountant later in the same year.

MR. ERIC J. LEAVER, Manager for Carron Company, leaves on July 2 for South Africa, where he will visit the works of Carron Company's subsidiary, Carron Company (South Africa), Ltd., at Germiston, near Johannesburg, and the Company's agents and customers in the Union and in Rhodesia.

MR. R. C. NASH, Chief Assistant to Mr. J. Smith, Managing Director of Edwin Danks & Co. (Oldbury), Ltd., since 1943, has been forced by ill-health to cease active participation in the affairs of the Company and he has therefore retired. His services will, however, be available for special duties.

MR. NORMAN REID, Chairman and Managing Director of the Accurate Recording Instrument Co., celebrated his 50 years in the industry on June 3, by entertaining the employees to a dinner party and dance. Mr. Reid founded 'Accurate' nearly 30 years ago, and continues fit and active despite having lost one leg (and much of the use of the other) through polio when he was a child. During dinner Mr. Reid announced that he was introducing a non-contributory pension scheme. There were, he said, many members with long service, and he hoped the scheme would encourage new employees.

Obituary

MR. CHARLES HERBERT RUTTER, formerly Engineer and General Manager of the Brighton Gas Company, died on June 9 after a short illness at his home in Sussex where he had lived since his retirement in 1934 after a career of nearly half a century in the gas industry. Mr. Rutter was the grandson of J. O. N. Rutter, who was appointed Engineer to the Brighton Gas Light and Coke Company in 1835. In 1886 he was articled to Joseph Cash, then Engineer and General Manager to the Brighton and Hove General Gas Company, which four years earlier had taken over the Brighton Gas Light and Coke Company, with which it had worked partly in parallel and partly in competition for over 50 years.

In 1895, Mr. Rutter superintended the installation of the first water gas sets at the works at Portslade shortly after the introduction of the process into this country from America; in fact, the Brighton Company was among the first half dozen companies in this country to adopt the new process. Two years later, Mr. Rutter was appointed Engineer and General Manager to the North Middlesex Gas Company, a position which he held until 1902 when he returned to Brighton as Resident Engineer at Portslade Works. In 1915, Mr. Cash retired and was succeeded as Engineer and General Manager by Mr. Rutter.

At the end of the 1914-18 war, Portslade works was badly in need of reconstruction and modernization, being still equipped with the small direct fixed settings of the type which had been in service there since 1870. Mr. Rutter set to with a will and during the following 15 years until his retirement, the works was rebuilt from end to end at a cost of approximately £500,000.

At the annual meeting of the Institution of Gas Engineers in 1926, Mr. Rutter presented a paper on 'Development and Reconstruction of Portslade Gasworks' and the following year he was awarded the H. E. Jones London Gold Medal in respect of this paper. He retired in 1934 after a distinguished career of 48 years, but he had already made provision so that the industry should not entirely lose the benefit of his long and varied experience. To this end, he had trained a number of articled pupils, of which the first was Mr. J. H. Carrington, now Deputy Works Engineer at Portslade; the one who attained to the greatest eminence being Mr. G. le B. Diamond, C.B.E., M.I.Mech.E., now Chairman of the West Midlands Gas Board.

During his long career at Brighton, Mr. Rutter had seen the annual make of gas quadrupled from 770 mill. cu.ft. in 1886 to approximately 3,000 mill. cu.ft. in 1934; and the annual receipts of the Company increase from £486,000 to £1,744,000. Although at the time of his death he was well on towards 90 years of age, Mr. Rutter contrived to the end to lead a busy and energetic life, farming his land with the enthusiasm which had always characterized him. By his pupils and by every employee of the Company, Mr. Rutter was universally beloved and his passing will bring real sorrow to hundreds who had had the privilege of serving under him.—D.L.B.

Diary

July 1.—MIDLAND SECTION, I.G.E.: Summer Meeting and Ladies' Day, Coventry.

July 5.—EAST MIDLANDS G.C.C.: Victoria Station Hotel, Nottingham, 11 a.m.

July 8.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Chairman's Day, Liverpool.

July 13.—SCOTTISH G.C.C.: Gas Board Offices, 26, Drumsheugh Gardens, Edinburgh, 11.30 a.m.

July 4.—NORTH EASTERN GAS BOARD SALESMEN'S CIRCLE (BRADFORD GROUP): Visit to the Rustless Iron Co., Ltd., Keighley, 6.30 p.m.

July 5.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, London, 11 a.m.

July 6.—NORTH EASTERN GAS BOARD SALESMEN'S CIRCLE: Area Meeting. Visit to the works of Thomas De La Rue, Ltd., Warwick.

Notes on Three Projects*

By E. O. Rose, B.Sc., M.I.C.E.†

TODAY I will confine my remarks to three projects, the new works at Ponders End completed in 1949, the extensions at Willoughby Lane which you will be able to see next month, and the new Segas plant now in the design stage.

I have always held that in undertaking new work of any description an engineer should be perfectly clear in his own mind as to what it is he hopes to achieve, and I have therefore always made a practice of writing down, at the commencement of each project, a series of notes setting out my aims. Constant reference to these notes, during the period of development, has the effect of correcting any unauthorized expansion of the project or any deviation from the main objective by the pursuit of any more attractive side line. Let me, therefore, give you some extracts from my notes in regard to the new works at Ponders End.

The site at Ponders End covered about 18 acres and was about one quarter covered by the old works which had a maximum capacity of some 3 mill. cu.ft. per diem in horizontal retorts and water gas. By the end of the war this plant was virtually worthless, and all concerned were agreed that it should be entirely demolished leaving a clean site for redevelopment. The inner area of the Tottenham undertaking was supplied by three works all within a few miles of each other, feeding into a common medium pressure distributing system, so that the first principle to be established was that, in the future, expansion should be achieved, not by small piecemeal additions at individual manufacturing stations but by additions of substantial size, each site being laid out to an appropriate capacity and developed in a limited number of stages.

The first point arising from this principle will be that the greater part of the plant at each site comes to the end of its natural life approximately at the same time. Future replacement can then be carried out to whatever pattern the circumstances of the time may demand without the plant to be replaced being inextricably entangled with other plant which must, for financial reasons, continue in action for many years to follow. In brief, it becomes possible to envisage a clean sweep at each site every forty years or so.

The second point arising is that if each site is developed with plant of the most efficient type available at the time of construction, the most economical way of working is to operate each plant, as originally designed, to the end of its natural life. Continual introduction of small improvements and alterations seldom repays the capital cost involved. Such amendments should only be made where some new development can be proved to show a marked and outstanding advantage.

The Tottenham undertaking has always had a ready outlet for its coke, and Ponders End was well sited for the supply of industrial coke for which there was and still is a good demand especially from the horticulturists in the Lea Valley. Estimates of production cost showed that with the prices ruling at the time of construction, the cheapest gas could be made by the carbonization of seaborne Durham coals and the sale of the maximum possible amount of coke. An intermittent chamber oven installation was therefore chosen, and gas was to be made at a calorific value of 560 B.Th.U. per cu.ft., steaming being kept at the minimum consistent with reasonable conditions at the bottom doors. The plant was therefore an embodiment of the principles set forth in the Simon Report. As no water gas plant was intended for some years to come a producer gas dilution plant was added to bring the calorific value of the delivered gas down to 470 B.Th.U. per cu.ft. which was the declared value operating at that time.

The next point to be considered was the labour situation. Ponders End, as its name indicates, had once been a straggling suburb surrounded by nursery gardens, and therefore one in which casual labour was readily available. In those days employment in the gas works ranked comparatively high in the social scale. It was now a busy industrial area, supporting many light industries, and within a few miles of the Royal Small Arms Factory. All these industries were working at high output, and unskilled labour had virtually ceased to exist. The efficient utilization of labour was therefore one of the main considerations of any new gasworks in this area. Although in 1945 labour rates had not increased since 1939, by as large a percentage as the net cost of coal, it was realized that with every award of increase the differentials between the rates for skilled and unskilled men were proportionately less in relation to the total wages paid. The use of skilled labour in preference to unskilled therefore added very little to the cost of gasmaking and would in any case tend towards a more stable and contented establishment.

'Too Much Formal Design'

A study of the lay-out of many existing gasworks, had led me to the view that, where there had been any conscious planning at all, engineers had given too much attention to formal and symmetrical design. Also, as they had mostly lived in a railway age, they had been forced to develop their sites with intricate railway systems serving every quarter of the works. The development of heavy road transport has now largely eliminated the need for railways in gasworks, except for the handling of coal and coke where such materials have to be railborne.

When endeavouring to reduce operating costs in some of these older works it had often been found that reduction in manpower was prevented by separate items of plant, which otherwise might well have been placed under the care of one attendant, being situated too far apart. In laying out a new site it was necessary, therefore, first to consider how much plant one skilled man, given adequate instrumentation, could fairly control, and then to dispose this plant around one central working position. The result of this approach in the case of Ponders End was that, excepting the retort house and coke handling plant, it was only necessary to employ two shift men on the remainder of this 7 mill. a day unit. One man looked after exhausters, electric generators, detarrers, washers, tar and liquor, purifiers, benzole extraction and water pumping, while the other looked after gasholder operation, gas drying, gas boosters and compressors and makes and outputs, keeping in touch by telephone with central control at Tottenham in regard to the latter.

Although the arrangement of the chambers was such as to reduce the labour employed to the minimum consistent with the standard design of settings adopted, it must be admitted that the problem of labour in retort houses, whether of intermittent chambers or continuous vertical or horizontal retorts, has not yet been given sufficient thought. I am confident that with care, patience and co-operation on all sides, the arduous and not too attractive tasks that have to be performed can be considerably reduced.

The new continuous vertical retorts at Tottenham for example are operated by one top man for each 16 retorts. The old house, erected in 1916 and recently put out of service, was operated with one man for 14 retorts, and there are many installations in action, I believe, where there is one man for each 12 retorts. It seems incredible that in forty years we have made so little advance in the saving of labour in these installations. I am convinced that if careful observations were made of all the tasks actually performed by one of these top men during a shift, and each movement timed and evaluated by proper time-study methods, modifications in plant could be made or other means evolved whereby considerable savings could be made in the work that has to be undertaken. I look forward to this as one of the tasks for the future.

Main Objectives at Ponders End

Returning to the subject of Ponders End works, I will briefly list the other main objectives set down before the commencement of design:

(1) The works was to be designed to produce gas and coke only. No by-products were to be worked up and these were

* From the Chairman's Address, delivered to the London and Southern Section, Institution of Gas Engineers, at its Spring Meeting.

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to be disposed of to the central chemical works or elsewhere. No coke transport was to be allocated to the site as the works was to concentrate on supplying merchants' requirements. The works was to have no obligations to other departments, or smaller outlying works, so that maintenance staff, especially building trades, could be kept to the minimum.

(2) As the works had to be constructed in the shortest possible time, immediately following the war, only standard plant of proved design was to be used.

(3) As at the time of construction electric and steam power plant was difficult to obtain at short delivery, the power arrangements were to be simple, even if some small loss of overall efficiency were involved. This problem was solved by the entire elimination of solid fuel boilers. The waste heat steam generated in the chamber house is utilized in non-condensing engines for exhausters and electric generators and the exhaust steam used for process work. The remaining power requirement is purchased. The works was started up six years ago on a pair of old Lancashire boilers which were then shut down, and has since been operating on waste heat boilers only. A small oil fired vertical boiler is now being installed for emergency purposes, in case steam pressure is lost through breakdown when only one bench is at work and a re-start is required.

(4) The site was to be fully paved or grassed over and kept clean, there was to be no rubbish dump and arrangements were to be made for removing all waste material as and when produced.

(5) Ironwork, requiring painting, especially on buildings, was to be reduced to a minimum. All plant buildings were, therefore, fitted with concrete window frames with no opening sashes. Ventilation was to be provided by controlled air inlets and vents independent of fenestration. No reason could be found for using the same piece of apparatus for providing both light and ventilation.

(6) The handling of coal to and from stock was to be carried out with the absolute minimum of labour. At Tottenham coal stoppages invariably occurred at times of peak output when it was exceedingly difficult to provide additional labour. Coal, at Ponders End, was therefore handled by a transporter capable of handling a full day's requirements well within a working day. One man was allocated to this machine throughout the year so that stocking or reclaiming produced no peak labour demand, and could therefore be undertaken at any time without inconvenience.

All these objectives were achieved and, after six years of satisfactory operation, the works is still clean and tidy.

Design at Willoughby Lane

Ponders End was barely completed when design work on the extensions at Willoughby Lane, Tottenham, was commenced. Here the main problems to be solved were entirely different. The existing plant comprised 6 mill. I.V.C., 5½ mill. C.V. and 9 mill. C.W.G., on a site where there were inadequate rail facilities and coal was stocked and reclaimed by steam locomotive cranes, the operating capacity of which amounted to only 60 tons per man per day. The site was cramped although there was ample space on the opposite side of the adjoining main line railway.

The 5½ mill. C.V. installation had to be replaced by a new installation of 8 mill. per diem and space had to be allowed for a further installation of the same size. Only two alternatives were possible—to build the new plant as a separate works on the other side of the railway or to concentrate all gas making plant on the existing site, transferring all coal and coke handling plant to the other side of the railway. The second alternative was chosen and the new C.V. installation and central coaling plant have recently been put to work.

For many years before the war, the old Tottenham Company had worked hard to develop a good local coke market, both domestic and industrial. A good free-burning continuous vertical coke was sold for domestic purposes while the larger sizes of coke from the intermittent vertical chambers were readily purchased by institutions and industrial establishments. The success of this policy was due, in a large measure, to the high quality of the coke itself.

For the continuous vertical plant, washed South Yorkshire and Derbyshire coals were purchased on the basis of 5% ash and 5% moisture content and penalties were applied when the combined ash and moisture content exceeded 10%. A bonus was also payable in respect of coal containing less than 6% combined ash and moisture. It is easy to see that under these conditions coke of a consistent quality, and containing 7% or less of ash, could be produced. In a similar way, for the intermittent vertical plant, Durham coals were purchased on a basis of 6½% ash and 3% moisture. With the outbreak of war these arrangements lapsed and one by one most of the low ash Yorkshire and Derbyshire coals were diverted elsewhere and inferior coals substituted. This has continued until the present time and the lowest trough was reached when two coals containing 14% and 15% of ash respectively were allocated to us.

As an example of the present position, last winter's programme for coal supply to the Tottenham Division shows the following distribution of ash in the Yorkshire and Derbyshire coals supplied:

Under 5% ash	40%
5% to 7% ash	47%
Over 7% ash	13%

This coal comes from 21 different pits and the weekly allocations of coal from any particular pit vary from 100 tons as a minimum to 505 tons as a maximum. Further, 29% of the coals supplied contain a high proportion of shale, over 0.5%, which renders them unsuitable for the production of a high quality domestic smokeless fuel.

These coals are no doubt allocated to the gas boards and other users on the principle of 'share and share alike', but it is quite obvious that if, in every carbonizing plant, even a small percentage of high ash or shaley coal is added, no single plant can produce a consistent or reliable coke. In these days the public is accustomed to buying most commodities ready packeted and under branded names. It is thereby assured of consistency in quality. It is not surprising, therefore, that some degree of uniformity should be expected when purchasing smokeless fuels. Branded fuels, in general, satisfy this requirement, but the same can scarcely be said of much of the gas coke placed upon the market.

A recommended specification for coke was published by the Gas Council in 1951, and this covered sizing, ash, moisture, shale, ignition and performance. Although the specified sizing may be accurately followed and ignition and performance tests applied with regularity, very little has been done to limit ash or shale content. A high ash content will demand additional labour in tending domestic fires but a far greater deterrent to the domestic use of coke is the present of shale. Shale will eventually choke any appliance and the act of having to extract solid lumps of incombustible material from the fuel bed inevitably gives the consumer the impression that he has been swindled. We are all familiar with the type of complaining letter that demands a hundred-weight of coke in return for the heap of shale assiduously collected by the enraged customer.

Flying shale has its own dangers, of which we are also fully aware. In order that this question of shale in coke could be dealt with at Tottenham, all coals in regular supply were subjected to testing by the 'float and sink' method and the proportion of 'bats' present was ascertained by hand picking from the 'sinks'. It was found that the Yorkshire and Derbyshire coals fell generally into three categories thus: (i) those with practically no bats, say less than 0.1%; (ii) those with from 0.1 to 0.5% of bats; (iii) those with from 2 to 3% of bats.

To conform to the Gas Council's coke specification it would have been necessary to carbonize only those coals having a 'bat' content of less than 0.15%. Of the Yorkshire and Derbyshire coals allocated only 47½% fell within this category. By extending the 'bat' content to 0.5% 71% could be included. Coals having a shale content above this limit, and comprising 29% of the Yorkshire and Derbyshire coals supplied were therefore marked as unsuitable for making domestic coke.

It was realized that there was little hope of getting these coals replaced by others of superior quality and that, if the quality of the domestic coke was to be improved, the remedy must be sought within the works itself.

It was obvious to us from the start that shaley coals, if carbonized, must be crushed to such a size as to allow the shale in the resulting coke to pass through the grate of any normal appliance. Examination led us to believe that although perfect results might only be achieved by grinding, a reason-

able degree of success should be obtainable, without resort to this expensive process, by the use of a flexible tooth crusher reducing the coal size to ¼ in. and under. Such a crusher was already in operation in connection with the small horizontal chambers installed at Barnet and the coke produced, though dense and not as free burning as might be desired, was at least consisent in quality and entirely free from obvious shale.

It was, therefore, decided that, as a first move, the most shaley Yorkshire and Derbyshire coals should be separated from the rest and blended with run-of-mine Durhams, the whole being crushed to ¼ in. and under. The resulting blend is now being carbonized in the intermittent vertical chambers. The strength of the coke has improved considerably, and although the screening analysis on test samples shows little change, it is apparent that there is less breakage in the later stages of handling and delivery.

As an alternative to blending these particular coals with Durhams in the I.V. plant, consideration has been given to exchanging the coals in question for non-caking or slightly caking coals. Investigation showed that insofar as a locality such as Tottenham was concerned none of these coals could be delivered at a price competitive with the coals already being received, neither was there any indication that they were readily available. The following table gives the main results of the investigation.

Coal	Moisture as received	Ash as received	Gray King therms as received	Swelling No.	Price d/d Tottenham (July 1954)
Coals in use					
Wingfield Manor..	8.1	6.5	61.2	2½	93/3
Brookhill					
doubles ..	7.8	4.1	66.5	3½	88/10
trebles ..	7.0	7.5	61.1	3½	89/10
Northern					
Bothal singles ..	10.6	9.7	63.2	2½	96/–
,, doubles ..	9.8	5.7	64.9	3½	95/–
Newbiggin ..	8.5	6.3	63.9	4½	95/–
West Midlands					
Baddesley ..	10.0	9.6	53.7	1	91/9
Coventry	8.6	10.2	56.9	1	91/–

The segregation of the shaley coals at Willoughby Lane and their blending on the intermittent vertical plant has resulted in the elimination from the continuous vertical plant of almost all the coals containing over 7% ash and the reduction of the proportion of high shale coals from 29% to 14%. Those shaley coals remaining are the less troublesome ones, and it is hoped by further exchanges to reduce and eventually eliminate them. The new continuous vertical plant is now, therefore, producing a good free-burning coke containing ash between the limits of 6% and 10% and much reduced in shale content. It is also strictly controlled as to water content. Water has been reduced to the minimum, but it has been found with less than about 6% moisture the men at the bagging plant complain of excessive dust. It is apparent that if coke any drier than this is to be sold, a dust extraction plant will have to be installed on the bagging machines and some form of special packaging adopted for those deliveries made to indoor storage bins. It is doubtful whether it is practicable at the present time to sell continuous vertical coke with a moisture content of less than 6%.

It has already been mentioned that, in addition to a new continuous vertical retort house, a new coal and coke handling system, to serve the whole works, has been installed. The coal handling system was designed to cover the 6 mill. I.V. house, the new 8 mill. C.V. house and a future house of the same size. It was designed to give the following facilities:

(a) To unload in time working 8-hour days the total coal required for each week plus an equal quantity for stock.

(b) To recover from stock, in a 16-hour working day, all the coal required to be carbonized that day.

(c) To provide blending hoppers and facilities initially for three grades of coal and later for four.

You will be able to see this plant next month, so I will not describe it in detail here. Some interesting problems arose, all of which we think we have solved without undue elaboration. One of these was the high speed tippling of railway wagons. The plant installed, which was duplicated, is capable of passing wagons over each tippler at the rate of one every two minutes. This time includes weighing, tippling, tareing, disposing of the empty wagon by a gravity fall-away and pushing the next wagon into position.

The coke handling plant was designed to: Convey and screen for sale, all the coke produced by the continuous vertical plant; convey screened coke from the intermittent vertical plant to: (a) intermittent vertical house producers, (b) continuous vertical house producers, (c) carburetted water gas plant.

In this way the maximum possible quantity of C.V. coke is made available for sale and a large part of the I.V. coke is used internally.

An interesting feature of the new continuous vertical retort plant is that the benches have been erected without the usual form of brick building, a series of 'umbrella' roofs being provided instead This roofing is generally similar to that in use with the intermittent plants at Willoughby Lane and Ponders End where experience since 1932 and 1949 respectively has shown them to be more advantageous than enclosed buildings. This is believed to be the first continuous vertical installation constructed without a building, and we have not, during the six months, mostly winter, in which it has been in operation, had any cause to regret our decision.

Architecturally the whole plant is strictly functional and was accepted as such by the town planning authority. As a civil engineer, who by his training has had to learn how to combine art and science to produce a result both acceptable to the eye and functionally satisfactory, I was glad not to be called upon to be responsible for an industrial cathedral.

Segas Plant

There is a third project, now in the design stage, about which I would like to say something.. This is the Segas plant which is to be built at Ponders End.

The high cost of coal in the Eastern Area and the increasing demand for coke are particularly favourable to the economic production of oil gas. The Board had expressed the wish some three years ago that the Segas process should be developed in the Tottenham Division, but action in this direction was withheld until the experience gained by the South Eastern Gas Board with the Sydenham plant was made available, and a larger unit could be constructed. It was considered that, for reasonable operating economy in a division handling 50 mill. cu.ft. per day, a plant making at least 6 or 8 mill. cu.ft. per diem was desirable.

The South Eastern Gas Board most kindly allowed us to send an operating engineer to work for a period on the Sydenham plant and put their experience at our disposal. We were satisfied that the process had been established on a reliable basis and that the further modifications to the reaction vessels proposed by the makers would show an improvement. The plant, however, as it stood, was not complete in all its ancillaries and there was still further development work to be undertaken in the conservation of power, the treatment of tar and the disposal of effluent. These were matters which, quite properly, had not been pursued to any great extent in the initial plant. This had been constructed mainly for the purposes of full scale investigation of the process reactions themselves.

The Eastern Gas Board already had in mind the use of the oil gas process to supplant coal gas manufacture entirely in certain parts of the Area and it was, therefore, our aim to develop, at Ponders End, a complete gas manufacturing unit of this type which would be entirely independent of any other plant on the works. We therefore envisaged a plant which was to be supplied only with oil, fresh water and electric power and was to produce only gas, effluent and sulphur from the purifiers.

When a plant of this kind, working in isolation, is considered, it can be seen that many of the auxiliary or overhead expenses associated with orthodox carbonization completely disappear. For example, the delivery of oil by road tankers, dipped on arrival by the plant operator, dispenses with road or rail weighbridges and the associated attendants, gatekeepers and clerks. Labour on coal and coke handling and stocking is non-existent and the general reduction of the number of men employed reduces the works and head office administrative costs accordingly.

The essential points of design laid down for the fully developed plant were:

(i) The whole of the steam required for the process was to be generated by a waste heat boiler, the firing of which could be augmented by oil or tar. No solid fuel firing was to be employed.

(ii) Steam was to be generated at a pressure that would provide sufficient power for operating the whole section by expansion through a turbine or turbines before being used in the process.

(iii) The tar was to be de-emulsified so that it could be used for firing.

(iv) The use of large quantities of cooling water was to be eliminated and the effluent was to be reduced to give the minimum possible pollution load.

(v) The plant was to be laid out so that, with the exception of changing purifier boxes, it could be operated by not more than two men per shift.

The power required for air blast is considerable, and, as in the case of a C.W.G. plant, is only required intermittently. For this reason the plant is being designed as two sets operating in phase on one blower. Each generator will make from 3.2 to 4.0 mill. cu.ft. of gas per diem and provision is made for working one generator only when low outputs are required. When both generators are working there will be a power export of 700 kWh. per mill. cu.ft. of gas, but when only one generator is at work a power input of 600 kWh. per mill. cu.ft. will be required. This is after providing for exhausters and all other auxiliaries.

The problem of supply of water and reduction of effluent will be solved by re-circulating the water required by the washer-cooler over a cooling tower and it is estimated that there will be a loss of water from the system which may be as much as 9,000 gal. per mill. cu.ft. To make up this deficiency it is proposed to divert, as far as possible, all the waste waters from the coal gas plant into the cooling system. The tendency of the cooling water to become acid will be checked by the neutralization with soda ash and the resulting concentration of sodium salts will be limited by maintaining a bleed from the system. This will constitute the only effluent and is estimated not to exceed 200 gal. per mill. cu.ft. with an oxygen absorption value in the region of 500 parts per 100,000.

It is hoped that this plant will be in operation within 18 months and that, by the fact of its isolation from other plant, the installation will give a clear indication of the cost of operating the process on a fully commercial basis.

Engineers

The vesting of the gas industry in the twelve boards has of necessity made the administrative structure within which we work much more complicated. Whatever and how various may have been the motives which urged the electorate to vote us into a nationalised system, the only real justification for the Gas Act of 1948 was the increased efficiency and improved service that could be obtained by integration and discipline.

Looking back over the past six years, and viewing the industry as a whole we can now see the situation much more clearly than we did at the start. I think we can say we can be proud of what has been achieved. It is surprising, when you come to think of it, what has been accomplished, in these few years, by engineers, administrators and others, many of whom, initially, were convinced that nationalisation was a retrograde step. I am referring not only to the progress made in physical integration and the building of an effective administrative structure, but also to the achievement, to a considerable degree, of a unity of purpose throughout the industry.

Speaking now as an engineer among engineers, how have the changes in organization affected us? To many of those employed in the larger undertakings there has been little change indeed, but the 'Engineer and Manager' of the smaller undertaking, who was personally and solely responsible to his Board for the conduct of his undertaking, is in a very different position. As integration proceeds functionalism is found to be the only possible system of organization and the engineer is relieved of many matters which previously came under his jurisdiction. This does not mean, however, that he has any less work to do, as the horizontal transactions he has to carry out with his colleagues in other spheres often take far more time to complete than he would spend settling the matter himself.

Even within his own sphere the engineer has to build up his own administrative system and, at whatever level he is placed, he finds that much of his time is spent in that one essential administrative occupation—passing information up and down the line. He has to give time to working out the detailed local application of instructions issued to him from a higher level, and in preparing reports on operation or installations for those at a higher level so that they in their turn can answer questions put to them from a higher level still.

The greatest personal problem of the engineer is, I think, to find sufficient time to do some engineering, and each one of us has to solve this in his own particular way. Between the two extremes of complete capitulation to the claims of administration and isolation in an ivory tower of science and technology there is an optimum mixture at which the maximum effect can be produced and it is up to each one of us to find it and resist all attempts from others to deflect us from our purpose.

It may be possible, or even desirable, for all I know, to run certain systems of administration by strict adherence at all levels to an all embracing code of practice. Many branches of Government operate in this way and there is a great temptation for us to fall into this apparently easy method of control in which all that is required from officers and staff is accuracy and a strict attention to duty. I hope, however, that, on the engineering side at least, we shall never be reduced to this and that no one will suggest that the training of an engineer is nothing more than the proper assimilation of rules and codes of practice. The engineer, whatever his administrative responsibilities may be, will always have his own particular engineering problems to solve and will always have a duty to exercise his own knowledge and experience in continually putting something into the system on his own account and in attending to those matters which he himself, and often only he himself, can see need to be undertaken.

It is a pity, as the years have gone by, that more and more of the design and development of new plant has been left to contractors. There was a time when this country led the world in gas engineering and the names of the men who pioneered are still with us. It is sad to reflect that since 1920 nearly all the major innovations in gas making plant and practice have been imported from the Continent or the U.S.A. If engineers now find themselves tied to their desks, filling in, or even concocting, questionnaires, is it not to some extent their own fault in that they have to climb the ladder of administration rather than win the satisfaction of achievement in their own sphere of engineering.

BELFAST USING MORE GAS

Belfast Corporation Gas Committee has approved increases in charges for gas which will involve an additional average cost to consumers of about 3d. per week. The increases are subject to the sanction of the Ministry of Commerce. Mr. J. C. Hyslop, Engineer and Manager, in his annual report, stated that it was more than two years since they had raised their charges for gas, and they had been selling during the past year below an economic price. When the new charges were in force, Belfast prices would still be substantially lower than in most comparable cities.

Since the last increase in price the Department had had to meet costs which for coal, wages, and capital charges alone amounted to more than £200,000 a year. With increases already notified, coal would cost £39,000 more per annum, wages would be £53,000 more, and gas oil and other sundry items were estimated to cost approximately £10,000 more, while capital charges were expected to show a further increase of £23,000. With the present scale of charges the financial results for the current year were expected to be £125,000 worse than for the past year.

Reviewing the past year, Mr. Hyslop said that there had been a substantially increased demand for gas and coke. Although coal and wages increases had been higher than was estimated they had reduced expenditure in other respects and had obtained increased revenue so that they had been able to finish the year with a net profit instead of an expected deficit. Annual output of gas had increased by nearly 30% in the past 12 years. Of the gas sent out, coal gas accounted for 79% and carburetted water gas 21%. Total sales through consumers' meters were 5,422.2 mill. cu.ft., 3,010.2 mill. having been taken by ordinary consumers and 1,903.6 mill. by auto consumers.

The Department had carbonized 246,035 tons of coal compared with 230,801 tons for the previous year, and from each ton they had produced 18,352 cu.ft. of gas.

Static Vertical Retorts at Southampton*

By H. G. BURGESS, Assoc.Inst.Gas E. and G. NEIL, M.Inst.Gas E.†

By the end of the first quarter of this century, the intermittent and continuous systems of vertical carbonization had become firmly established, but before long it was realized by many gas engineers that an improvement in technique should result if the advantages of the intermittent process could be effectively associated with those of the continuous vertical retort, as regards the extraction of cool coke and continuous steaming.

It was with this goal in view that the late Sir Arthur Duckham filed a patent, in June, 1930, for a system that may be considered the starting point in the evolution of the 'static' vertical retort. In 1934, the Woodall-Duckham Company designed a new form of carbonizing plant, which embodied the essential features of the 1930 patent, and this design appeared to offer sufficient promise of success to justify the erection of a pilot plant in order to explore the potentialities of the new process. Following in the tradition of co-operation between gas undertakings and plant constructors, an arrangement was reached whereby a test installation was erected at Croydon gasworks. This plant was put to work in April, 1936, and continued until October, 1938, when it was shut down at the completion of the experimental programme.

Early in 1936, it had become apparent that an extension of carbonizing plant was required at Southampton to meet increasing gas consumption. There being a demand for steam on the works, it was decided that a non-recuperative setting should be installed, and alternative schemes and tenders were given careful consideration. By April, 1937, the results already obtained at Croydon were reviewed, visits were made to the test plant, and further tests on the Durham run-of-mine coals normally carbonized at Southampton were arranged. Absence of steam and dust associated with coke quenching on intermittent vertical chamber plants was an attractive feature of the new system. Although continuous vertical retorts offered this same advantage, the characteristics of the coke from the test plant more closely resembled those of the coke then being supplied to consumers from the existing intermittent vertical chamber plant at Southampton. In view of these advantages and the results obtained on the test plant, an order was placed in July, 1937, for a commercial plant on this system, of 2 mill. cu.ft. of gas per diem capacity.

Only four years had elapsed between the date of the preparation of the first sketch of the experimental static vertical retort as built at Croydon and the putting to work of the first commercial unit at Southampton in February, 1939. Even before the full working results of the Southampton plant were available, a second unit, with a capacity of 1 mill. cu.ft. of gas per diem, was installed at Cambridge; this plant was put to work in 1940, and extended in 1943 to 2 mill. cu.ft. of gas per diem, and also is still in operation.

The Two Southampton Plants

Each plant consists of a bench containing 20 static vertical retorts set in a double line and complete with independent external producers and waste-heat boiler. The two plants are arranged in line within a single house, and normally work as one installation as regards coal and coke handling; they are also served by a common chimney, lift and fume-extraction plant. The retorts have major axes of 120 in. and minor axes of 11 in. at the top and 18 in. at the base of the cooling chamber. Each setting is supplied with producer gas from five step-grate producers arranged in an independent battery with common internal producer gas flue. Five uptakes from this flue each branch into two necks, which in turn supply four heating flues, two on the 'odd' side and two, by way of a cross-under flue, on the 'even' side. Secondary air enters at the centre of the double line of retorts and is preheated by passing between the pairs of retort support joists (thereby keeping them cool) before entering uptakes built into the front walls. From these uptakes, air can be admitted to the first, third and fourth passes of the heating flues. The waste gases from each setting leave by way of 10 necks into a waste-gas main, arranged at one side of the bench, and thence to the waste-heat boiler designed for a working pressure of 150 lb. per sq. in. The pull on the heating flues is normally provided by an induced-draught turbo-fan mounted on the waste-heat boiler and controlled by a butterfly valve at the base of the boiler outlet stack. In the event of either or both waste-heat boilers being out of commission, the common chimney is capable of providing adequate pull for both settings by natural draught.

The overhead coal hoppers extend the full length of each bench and are self-emptying. The top gas offtakes are of the liquor-flushed type provided with dish-type isolating valves before the collecting main. Fume extraction is confined to top of setting level, and is accomplished by ventilating shafts carried through the overhead coal hoppers and discharged above roof level, and also by extractor plant for dealing with fumes emanating from the top gas offtakes during charging of the retorts.

The coke extractors are driven by means of a centrally disposed push-button controlled motor through shafting along each side of the benches, arranged to drive the extractor shafts through bevel gearing and chain drives. Coal is raised from the adjoining store by twin bucket elevators and delivered by 30 in. belt conveyors on to reversible shuttle bands for discharge into the overhead coal hoppers; the capacity of the coal-handling plant is 90 tons per hour.

Maintenance

Records of maintenance contain most of the essentials that make up the history of a plant or piece of equipment, and in the case of carbonizing plants it is the resets that represent the points from which successive eras in the life of the plant may be reckoned. Resets generally represent by far the highest single item of expenditure on a carbonizing plant, and, if occurring at too frequent intervals, can very easily offset the economic advantage claimed for a plant of comparatively high thermal efficiency. In fact, the very measures taken to attain high thermal efficiencies can well be those responsible for frequent resets.

It is most difficult and indeed unwise to attempt to reduce these high reset costs by means of economies such as are often applied with safety to other forms of maintenance. Rather, every effort should be made to lengthen the period between resets, carefully balancing the dearer therm through reduced efficiency and higher day-to-day maintenance costs against the additional spread over of reset costs. The more expensive, substitute carburetted water gas therm that may have to be provided during the reset should also enter into the overall calculations.

A summary of general information relating to resets of the two static plants is set out in Table 1. Actual costs have been used, and these include those incurred by the undertaking's personnel on repairs to bench iron and steel work, etc., during the shut-down periods.

The individual reset costs are not strictly comparable, due to variations in the period between resets, tonnage of coal carbonized and type of reset; average costs have, therefore, been included for the two plants, both separately and combined, in order to provide more realistic figures for purposes of comparison with other plants.

During the past 16 years, the brickwork as a whole has required little attention, and the design dimensions and shape

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*, From a paper presented to the 92nd Annual General Meeting of the Institution of Gas Engineers May 24-27. (Communication No. 464.)

† Constructional Engineer and Engineer and General Manager, respectively, of the Southampton and District Gas Undertaking, Southern Gas Board.

TABLE 1

Static	Dates		Working			Resets		
	From	To	Days	Tons	Tons per day	Type	Days	Pence per ton
1	2	3	4	5	6	7	8	9
1	17. 2.39	4. 4.44	1,874	213,100	114	—	—	—
	5. 4.44	6.11.44	—	—	—	Partial	216	19.2
	7.11.44	28. 3.49	1,603	189,766	118	—	—	—
	29. 3.49	8. 1.50	—	—	—	Full	286	57.5
	9. 1.50	31. 3.53	1,178	144,921	123	—	—	—
	1. 4.53	20.10.53	—	—	—	Partial	203	40.6
	17. 2.39	20.10.53	4,655	547,787	117	2-P.I-F.	705	38.1
2	4.11.47	2. 4.51	1,246	150,778	121	—	—	—
	3. 4.51	17.10.51	—	—	—	Partial	198	27.7
	18.10.51	6. 4.55	1,267	159,873	123	—	—	—
	7. 4.55	23.10.55	—	—	—	Partial	200	41.8
	4.11.47	23.10.55	2,513	310,651	122	2-P.O-F.	398	34.9
	Totals		7,168 86.6%	858,438	119	4-P.I-F.	1,103 13.4%	37.0

of the two batteries of five producers have been generally retained.

Cooling Chamber Linings

Following an inspection in November, 1939 (nine months after commencement of gasmaking), it was apparent that the cooling-chamber linings on the first installation were wearing more rapidly than those of the test installation at Croydon, where similar 'Burn' firebricks and No. 1 plastic jointing cement had been used; furthermore, there was more fracturing of the edges of the bricks in the region of the horizontal cast iron brick supports separating the three sections of linings. The increase in the rate of wear was attributed to production of harder coke on the Southampton plant. Although the face of the cast iron supports was exposed at certain points, the metal was standing up well to the conditions, which are similar to those imposed upon the unlined seating castings of continuous vertical retorts.

When a further inspection was made, in February, 1941 (after two years of continuous working), it was found that practically the whole face of the cast iron supports was exposed. Although there were other local failures, including missing bricks and disintegration around the steaming ports, the condition of the side linings, particularly the top sections, was fair. In striking contrast, the end linings were in very bad condition; generally they had been worn back to the tongue (about 2 in.) and the bricks could be removed by hand, but, as in the case of the sides, the wear was most severe in the bottom section and decreased towards the top of the chamber. The jointing material was also showing signs of disintegration and in many cases was missing back to the tongue, the space becoming filled with fine coke.

Temporary patching was carried out, but, as a precaution, firebricks were ordered for lining the bottom and middle sections of all 20 chambers. As 'Burn' material was not then available, due to extensive Government commitments, the firebricks were supplied in 'Nettle,' this being considered equally satisfactory material.

By the end of 1941, it was evident that relining of the cooling chambers could not be postponed until the reset, but would have to be carried out while the plant was making gas. This was done between January 8 and April 10, 1942. Each chamber was out of commission for an average of 13 days, and during that period the whole of the bottom and middle sections and ends of the top section were relined, the sides of the top sections were patched and casing plates renewed. The opportunity was taken to incorporate several experimental modifications in an endeavour to discover means for extending the life of future linings. These included the provision of extra clearances between the mild steel, cast iron and brickwork to overcome the differences in expansion between these dissimilar materials. The expansion cavity behind the end linings was reduced to increase the stability of the bricks and the 'Caposil' No. 3 non-conducting composition for that cavity was made up and applied as a plaster to obtain greater consistency of packing and ease of application. The bottom end sections were lined in either 'Haunchwood' blue bricks or 'Metalline' acid proof squares, which, together with the new 'Nettle' shapes, were hoped to lead to the discovery of a more suitable lining material. In addition to No. 1 plastic, other jointing cements were used, and in certain chambers the joints were pointed in special cements, while on others the entire surface was treated with hardening solutions.

Inspections were carried out in July, 1942, February, 1943, and in the following June, but, with the exception of the 'Metalline' bricks, the results of the experiments revealed no improvement. At the June, 1943, inspection, after 15 months' continuous working, the condition of the surface and edges of the 'Metalline' was, for all practical purposes, as good as on the day the bricks were installed. Although the density of this material is 30% greater than that of 'Nettle' or 'Burn,' the cooling-chamber support steelwork had been designed on generous lines and could readily take the extra load should 'Metalline' be found suitable for the range of conditions throughout the cooling chamber.

Therefore, in the 1944 reset, 'Metalline' was used for the bottom and middle sections, but 'Nettle' retained for the top section. To test the suitability of the new material at the comparatively high temperature attained in the top section, the materials for the top and middle sections of four chambers were interchanged. The opportunity was also taken to modify the shapes adjoining the supports in an endeavour to reduce the tendency for the edges to break away.

From the three months' experience on the four trial chambers, it was decided to use 'Metalline' on all three sections of the ends, the bottom and middle sections of the sides and bottom course on the side top sections, while 'Burn' material, made specially dense, was used for the remainder of the top side sections. Once again, experimental modifications were made, this time to the cast iron supports as well as the adjoining courses of bricks.

Corrosion of Casings

Dismantling of the cooling-chamber linings in 1942 revealed extensive internal corrosion of the mild steel casings. Attack had occurred at all levels, but was most severe at the top section outer ends on the 'even' chambers. The rust followed a well defined pattern suggestive of 'tracking' by air that had infiltrated through the rodding holes, cracks in the extractor boxes, etc. Furthermore, as the casings were frequently below 100°C. and the chamber contained steam and corrosive vapours from the coke, corrosion seemed inevitable; the condensate coming from the discharge doors amounted to 15 gal. per retort per 10 hour charging cycle. The areas most affected were renewed, and, to facilitate future replacement of the ends, the new plates were bolted to an angle flange welded to the casing sides.

The new design of casing has proved to be less effective in practice than was expected; to remove a corroded plate while the plant is in use and bolt a new one in place is a comparatively lengthy operation carried out under arduous conditions, and it is also extremely difficult to make the sandwich joints gastight. The present practice is to burn out the corroded plate along the toe of the angle flange, clean and render the back of the exposed lining and weld a new plate in position.

Expansion Joints

Expansion and contraction of the cooling chambers relative to the fixed extractor boxes was originally accommodated by a deep sliding joint between the support channels for the extractor boxes and the bottom of the casings. To obtain a gastight joint the top half of this annular space was packed with asbestos rope, but the remaining space became virtually a condenser and by 1942 contained considerable damp, sulphurous deposits derived from the corrosive vapours within the cooling chambers. Furthermore, the asbestos rope was becoming impregnated with the deposits and did not make a completely gastight joint.

Experiments to find a satisfactory packing compound (are described), and results indicate that at last the answer has been found. As so often happens, this is quite simple—alternate layers of asbestos rope and pitch thickened by the addition of carbonaceous dust. The temperature at the joint is sufficiently high to maintain the pitch in a fluid state, but the dust additive increases viscosity and prevents running into the cooling chamber as occurred when experimenting with pitch alone. Furthermore, the asbestos rope, becoming saturated with pitch, is prevented from absorbing the corrosive vapours within the cooling chamber. A 'head' of pitch, which

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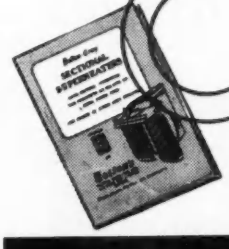

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requires only occasional topping-up, is maintained to make good any losses.

Coke Haulage

The travelling coke skips were originally fitted internally with hinged plates whereby their capacity could be adjusted, and so provide a means of controlling the amount of coke extracted and, in consequence, the depth of coal charge. But, once the depth of charge has been established, these plates were no longer required, and to avoid unnecessary maintenance they were removed and the skips modified to a fixed capacity.

On the first plant, the full skips were pushed by electric-battery locomotive to the west end of the bench, where their contents were discharged through manually operated regulating gates on to a horizontal belt conveyor disposed at right-angles to the line of retorts. The site for the second plant was fixed to the west and in line with static 1, in order that this conveyor, now situated between the two plants, could serve both benches. However, due to restricted manœuvring space and complications in bridging the conveyor trench, the locomotive was abandoned, and two independent sets of chain haulage gear were installed to serve the two lines of retorts on both plants. The average life of the chains (½ in. dia. mild steel welded links) is six months but apart from this item, the maintenance of the equipment is comparatively light.

Carrier Gas

In April, 1954, experiments were conducted with the introduction of 'carrier gas' (blue and carburetted water gas) in place of steam on one cooling chamber, and by thus eliminating the production of water gas within the retort a substantial reduction in slag erosion could no doubt be obtained. But although cooling of the coke was successfully accomplished during the 10 hour charging cycle, the spectacular results obtained on continuous vertical retorts were not realized; in fact, no reduction in the charging cycle could be obtained, due to the intermittent nature of the process. Furthermore, back pressure exhaust steam from the liquor-circulating pumps is utilized as bottom steam on the cooling chambers, and on economic grounds it is not possible to produce a favourable case for conversion to 'carrier gas'.

Operation

When the first static vertical retort plant was originally projected in 1937-38, the producers were designed for heating the 20 retorts when utilizing breeze as part producer fuel. Since that date, further experience has been gained in the matter of burning breeze from Durham coals. It is found that the lower reactivity of the coke, coupled with the higher ash content of Durham coals, makes it very difficult to get real satisfaction from breeze-burning when using this fuel; in addition, more dust is carried forward into the combustion flues, resulting in extra flue cleaning and increased risk of fluxing. Although these points are hard to assess, no clear financial advantage can be shown to justify the inclusion of breeze, and in the static plants it is the practice to pass run-of-retort coke over a scalping screen for removal of ¼ in. breeze before discharge into the producer fuel hopper.

The control and operation of the producers is similar to those installed by the Woodall-Duckham Company on their non-recuperative settings of continuous vertical retorts and intermittent vertical chambers.

Carbonizing temperatures are controlled in the same manner as on lambently heated settings of intermittent vertical chamber plants, and the same precautions and points requiring routine attention apply.

Wide variations in carbonizing temperatures can readily be made to suit different lengths of charging cycle, class of coal, quality of gas, *etc.*, but the two statics are operated as base-load plants with volume and quality of gas output as constant as the variations in coal quality will permit. The whole of the coals carbonized are Durham run-of-mine, and the charging cycle, depth of charge, carbonizing temperatures, *etc.*, best suited to these conditions are now well established.

Prior to March, 1948, the normal steaming cycle on both plants had been the introduction of superheated top steam for the duration of the net carbonizing period, and saturated bottom steam for the first 4 and last 1½ hours. As from that date, back-pressure exhaust steam has been utilized for bottom steaming, and, in order to take full advantage of this system and simplify the routine of manual valve operation, the bottom steam also is now admitted, at a correspondingly reduced rate, for the full net carbonizing period.

The steam to the cooling chambers passes through calibrated steel orifices immediately before entering each port, and the rate of steam admission is controlled by adjustment of the reducing valves on the supply mains. For normal working conditions, pressure of the superheated top steam is maintained at 20 lb. per sq. in., and the exhaust steam supply for bottom steaming at 15 lb. per sq. in. At these pressures, the combined top and bottom steam is admitted to individual cooling chambers at the rate of 124 lb. per hour, representing steaming at 19.3%.

TABLE II

1	Results (under scurfing conditions) Test 2	Average working 3
Coal carbonized per diem. (tons)	125.8	123
Total moisture and ash in coal (%)	9.2	11.1
Gas made per diem—		
Cu. ft.	2,122,000	2,030,000
Therms	10,670	9,950
Gross calorific value of gas—		
B.Th.U. per cu. ft.	503	490
Gas made per ton of coal carbonized—		
Cu. ft.	16,868	16,500
Therms	84.8	80.9
Gross carbonizing time (hours)	9.95	10
Fuel to producers (dry; ash-free)—(lb. per 100 lb. of coal carbonized)	19.85	19.9
Residuals for sale per ton of coal carbonized—		
Coke (cwt.)	—	7.1
Breeze (cwt.)	—	1.6
Tar (gal.)	—	12.3

TABLE III

1	Cost per therm 2 %	3 Pence	4 Pence
Debit—			
Coal (gross cost)	89.75	12.87	
Water (24.5d. per 1,000 gal., gross)	0.63	0.09	
Electricity (1.1d. per kW)	0.07	0.01	
Consumable stores, etc.	0.28	0.04	
Operating labour	3.34	0.48	
Repairs and maintenance	2.72	0.39	
Resets	3.21	0.46	
	100.00		14.34
Credit—			
Surplus steam (72d. per 1,000 lb.)	9.71	0.66	
Coke for sale (94s. per ton, net)	72.62	4.94	
Breeze for sale (36s. 5d. per ton, net)	6.34	0.43	
Tar (5d. per gal., net)	11.33	0.77	
	100.00		6.80
			7.54

Performance

Under normal operational conditions on the Southampton works, the coal gas streams from the two static plants are combined with those from the horizontal and intermittent vertical chamber installations, and these pass through common ancillary plant and station meters. To obtain accurate figures of results from the two static plants, special arrangements must be made to sectionalize the coal gas streams, but, with the available ancillary plant and metering facilities, this method of working is possible for short periods only and at infrequent intervals.

The test results shown in Table II were obtained on static 1 during such an occasion after one year's life of the setting. The average working results for the last few years, as shown in Table II, are given with every confidence. These practical results take into account scurfing, coal gas leakage into the flues, retorts off for silica welding and other hot repairs, hanging charges, extensions of gross carbonizing time to facilitate maintenance, *etc.*, all of which tend to reduce output.

Both the test and average working results are corrected to S.T.P.

Actual costs incurred in the operation, maintenance, *etc.*, of the static plant for the year ended March 31, 1954, related to

the average thermal production shown in column 3 of Table II, are shown in Table III.

As the actual capital cost of the two plants as erected in 1939 and 1947 bears no relationship to present-day prices, the capital charges have been excluded from the above tabulation. However, on the basis of actual cost, rates of interest ruling in those years, and a proper rate of depreciation, the capital charge would amount to 0.30d. per therm.

Credit for benzole and liquor have also been excluded; in the case of the former, it is the practice in the Southampton undertaking to credit gas purification—and not carbonization—with this item, and it would be unrealistic to show a credit for the latter.

DISCUSSION

Mr. S. E. Whitehead (Deputy Chairman, Southern Gas Board), who recalled that he was responsible for the installation of the two Southampton plants referred to, said it was a fact that the static vertical retort had not been widely adopted, but his opinion was that it would in due course be reconsidered. It had proved to be an excellent method of carbonization and extremely versatile in dealing with the kind of coal which it was given.

The high consumption of fuel in the producers was due to the fact that the plant was non-recuperative. The Southampton works had long been very congested, and the addition of recuperators would have made it necessary to provide more space, and this in turn would have necessitated scrapping some existing and useful horizontal plant. Coke was not as valuable in 1939 as it was now. The third and most important reason was that, when the first bench of static retorts was planned, they were also considering the installation of new electrical generating plant on a fairly big scale, for which the large quantity of waste-heat steam would have been useful, and it was planned for that. That, however, was rendered impossible by preparations for the impending war, which compelled them to adopt what was now the usual practice, namely to take an extra supply of electricity from the grid.

Contractors' Viewpoint

Mr. T. C. Finlayson (Woodall-Duckham Construction Co., Ltd.) said the two static plants at Southampton would by the end of this year have carbonized nearly 1 mill. tons of coal, and, in spite of four years of aerial bombardment, the plants had earned the good words of the authors, who said that a steady rise in average coal throughput had been achieved over the past 16 years, since the first unit went to work. In their introduction the authors had said 'Following in the tradition of co-operation between gas undertakings and plant constructors, an arrangement was reached whereby a test installation was erected at Croydon gasworks.' The present paper typified that same tradition of co-operation, which had not lessened since the nationalisation of the gas industry. Throughout these 16 years the Southampton technical staff and the plant constructors' staff had examined each difficulty and had jointly sought its solution. Speaking as the designer of the plant, he would like to say how very fortunate they had been to have had throughout the whole period the enthusiastic and able co-operation of the two authors.

There were two lessons to be learnt from the paper. The first and foremost was the necessity of having first-class gas engineers on the works, with the requisite time to devote to engineering and production problems. He might be a little old-fashioned, but he still believed that profits were made or lost in the retort house or its equivalent. Second, however carefully a new type of plant or process was conceived and developed, practical performance over a long period of time was necessary before making a final assessment. This well justified the wisdom of the authors in waiting for a number of years before presenting the paper, and had made it much more valuable.

Cost of Resetting

When considering the average resetting cost of the Southampton plant, at just over 3s. per ton, it must be remembered that consistently high therms per ton had been made, which could usually be achieved only by heavier wear and tear on the brickwork. The authors had emphasized the trouble spots which were revealed in practice rather than the trouble-free features which the designers fortunately planned correctly. What could be said with certainty was that, as a result of the co-operation at Southampton, ways and means had been found to reduce the frequency and cost of maintaining the static vertical retort plant. Emphasis had been laid by the authors on the spray welding process as a means for the hot maintenance of silica retorts. The method had unquestionably been of great service to Southampton. The spray welding process had attracted world-wide interest and was now in use in 22 countries, including the United Kingdom, and had proved a boon for hot repairs to carbonizing plant on gasworks and coke oven plant.

Cambridge Comparisons

Mr. E. H. Winch (Cambridge) said that when new carbonizing plant was being considered at Cambridge in the late 1930's certain important factors had to be borne in mind. An important market had been built up for large horizontal retort coke for central heating, as would be expected in a university town. In addition, a good and lucrative market for road tar had been established locally. Some of the factors which influenced Southampton's choice of the static vertical plant also operated at Cambridge, where the principal requirements were: (i) a high yield of gas per ton of coal; (ii) a coke which was hard and generally similar to the coke then being produced in horizontal retorts which were to continue in operation; (iii) a tar which could be distilled to yield equally satisfactory road tar to that from horizontals; and (iv) a plant which would be clean in operation with reasonably complete elimination of dust and smoke, this latter being a most important consideration in order to conform with the amenities of the university town.

It was therefore natural that consideration should be given to the recently-developed static vertical plant, which claimed to combine certain features of the continuous retort and the intermittent vertical chamber. It appeared that this system met all the requirements and it was decided to install 10 retorts, which came into operation in December, 1939, and were subsequently extended in 1943 by a further eight retorts to complete a bench capable of producing 2 mill. cu.ft. of gas per day.

Differences in Design

There were two important differences in the design of the Cambridge plant. The retorts were in a single line, and the minor axis of the retorts was 1¼ in. wider at the top than in the Southampton plant, although the remaining retort dimensions were the same. That difference was because the Cambridge plant was designed to carbonize principally South Yorkshire coal with an admixture of a proportion of East Midlands coal. Another difference was that the coke extractors were driven by a hand-propelled travelling extractor car incorporating an electric drive connected as required to each extractor shaft by a hand-operated clutch. This arrangement had been singularly trouble-free.

During a seven-day trial eight months after the first 10 retorts were first commissioned, using selected South Yorkshire coals, the exceptionally good result of 96.7 therms per ton of coal of 508 B.Th.U. gas was obtained, having a hydrocarbon enrichment value of 43.2; 46% of the coke made was 2 in. and over in size. Yearly results in the 10 years from 1945 to date had varied between 82.4 and 91.2 therms per ton at calorific values between 464 and 492 B.Th.U., with an average of 86.7 therms at 472 B.Th.U. The proportion of large coke had, however, been much lower due to the higher ash content of the coal available and the greater proportion of East Midlands coal used.

The wider retorts in use at Cambridge had justified the assumption that the heat penetration with Yorkshire coals would be more rapid than with Durham coals, but it had been necessary to operate at higher combustion flue temperatures.

Leakages into Combustion Flues

Erosion of the silica caused severe leakage of gas into the combustion flues and as at Southampton, they also found that regular silica welding at that period greatly extended the life of the retorts. The 18 retorts at Cambridge had been reset completely once only—*i.e.*, a complete rebuild of the monolith, and that was after an average working life of 10½ years, during

(*Concluded on p. 915*)

PUMPING OF LIQUIDS IN GASWORKS

Discussion on the paper presented to the Institution of Gas Engineers annual meeting by L. J. Clark. Abstracts from the paper were given in the June 8 issue of the JOURNAL

MR. F. M. BIRKS, C.B.E. (Deputy Chairman, North Thames Gas Board), said that the author's theme was one of extensive electrification in place of the great length of steam mains necessary to supply numbers of small, direct-driven pumps by steam, on the basis that the consumption of steam by these individual pumps was so very much greater than that of some central electrical generating plant in the works, or of the public electricity supply. The general overall amount of steam used was therefore much lower; but this was not the only point, as the author had shown. It was really a question of shutting down the very long and inefficient steam mains which were to be found in so many works.

The production engineer, who had a great many difficulties to face in his work, naturally tended to take rather a short view and was inclined to favour the use of an occasional steam pump for all sorts of duties when he was in difficulties. One type of pump which the author had not mentioned, and which Mr. Birks regretted to say was still in use, even in some areas near London, was the old steam jet. The combination of a long steam main and a steam jet, having regard to the necessity to conserve our fuel supplies, should be looked on with utter horror. He was afraid that the author would find it easier to electrify pumps than to eliminate steam mains at the present time, but hoped that, as the years went by, these mains would be entirely eliminated. No modern gasworks should have a steam main more than a few feet in length.

The author dealt with air vessels, and Mr. Birks thought that it was right to say that these sections of plant were more neglected than anything else. This was really due to the fact that they were not understood, and the author's remarks would be of great assistance to people using this type of plant.

Rotary Pumps

The author's comments on the situations in which rotary pumps were most suitable were very well timed. In certain circumstances these pumps proved very useful tools. When first introduced they were mainly used, he thought, to pump milk and beer, but now there had been added oil, which was used in far greater quantities than ever before. The author gave examples of the uses of these pumps and indicated that the average cost, including capital charges and maintenance costs, compared favourably with that of pumps of the reciprocating type. Mr. Birks was not sure whether the author meant that the efficiency expressed in current consumption throughout the whole of the period was the same, because, as the pump required replacement at such frequent intervals, there must have been very long periods when it was not working at its correct efficiency.

Mr. Clifford Howl (Lee Howl & Co., Ltd.) cited the wide range of pumps referred to in the paper and said that it would be realized how great was the interest of the pump manufacturer in the subject. He thought that in Fig. 1 of the paper the author had taken the curve for reciprocating pumps much too high. While he did not say for a moment that one could not buy pumps up to the limits shown, he did think that, in these days, the centrifugal pump was much cheaper, and in the higher ranges of gallonage one should look to a centrifugal and not to a reciprocating pump.

In Defence of Steam Pumps

Steam pumps had rather a hard kick from the author, and from Mr. Birks, and he thought that their remarks were justified. Economy was something which every manufacturer, whether of gas or of machine tools, had to watch perpetually, and he agreed that steam was much more expensive than electricity. On the other hand, convenience and ability to do the job still sometimes outweighed economy, and the steam pump had the great advantage over anything else of flexibility. It was not tied to a speed; one could, by simple governors, graduate both speed and head, and nothing else quite filled the bill. Also, when pumping viscous liquids, in cold weather, the viscosity could be greatly increased, and, in this case, the steam pump would stick to its job and no harm would come to it even if it was completely slowed up.

In the paper the author touched on multi-stage pumps, and did not seem very keen on balance discs, which were a necessity in these pumps. He suggested thrust bearings instead, The thrust bearing was possibly an improvement. On the other hand, it was possible to obtain today, in the latest designs, a multi-stage pump split-cased in which the water ports were taken in such a way in the case that the water was led alternately to right- and left-hand impellers. This gave a very good balance.

Mr. Howl was also very interested in what the author said about self-priming and wished to make it clear that there were two kinds of self-priming. The method was very well understood, although possibly thought out of date, of filling up the case and filling the suction pipe. He pointed out that a centrifugal pump would not start unless the case was absolutely clear of air. The author described an excellent method, but, where one had an expensive pump, Mr. Howl thought that to extend the tail-shaft and add a scotch and a self-priming pump was an excellent way of getting over the difficulty. On the other hand there were times, particularly when pumping petrol, when vaporous liquid existed as the tank level dropped, and it was necessary to incorporate in the pump, running all the time, a self-priming device of some sort.

One pump which the author missed was the multi-cell pump, used on gas washers. This pump was brought out by one of the leading gasworks contractors. Instead of dotting pumps all over the place a multi-cell pump could be bought which was four, six or eight pumps incorporated in one case and driven by one power unit. It was very impervious to dirt, which was an important matter, and it was one of the latest additions to the range.

Unchokable Pumps

Every day, so it seemed to Mr. Howl, from the enquiries which reached him, more and more awkward things had to be pumped, and in some of the liquids there were bits and pieces of all sorts, which could lead to a great deal of trouble. With a reciprocating pump the valves might be affected, and with a normal centrifugal pump there was a risk of caulking up the nozzles and the pump becoming unworkable. With the unchokable pump, on the other hand, anything which could go into it would pass out on the other side.

The author mentioned some very interesting examples of modern packing and glands. Where one had any kind of liquid to deal with which was so abrasive that it was not possible to get satisfactory glands, the unchokable impeller with simple strips on the blades which ran close to the gland, created a vacuum, and so got over the difficulty. In washeries the pump manufacturers had had very great difficulty in this respect, and these back blades had acted as a cure.

The author had shown what was almost the latest pump to be brought out, the submersible pump in which the motor worked under water. A great deal of money had been spent on it and a great deal of ingenuity shown in its development. Possibly the chief credit should be given to the electrical engineer, because the electrical side predominated. This pump was now obtainable in large quantities, Mr. Howl said, and he thought that it was a success. On the other hand, as with everything else that happened with pumps, never were the older types completely superseded. The author compared the efficiency of the submersible pump with that of the air lift, but Mr. Howl thought that he should compare it, strictly speaking, with the shaft-type pump or even with the old-fashioned double-acting reciprocating pump. This last would still be the most economic.

Borehole Pumping

Referring to borehole pumping, Mr. Howl said that again there was an excellent choice of pumps. There were the direct-acting double-acting reciprocating pump, and the shaft type. The author mentioned the shaft working in a tube, but

Mr. Howl did not favour that; the plain shaft was easily the most satisfactory. There were also the air lift and the submersible pump. One point about boring was that the boring contractor, if given the right specification, would promise to bore a straight hole, but cases had been known where the specification had not even covered very bad kinks. The shaft and the reciprocating types of pump were at a disadvantage in such a case, but the submersible type was satisfactory.

Mr. Howl said that he would like to refer to a point raised by Mr. Birks. All of those who occupied responsible positions had to pay great regard to economy. He could not help thinking, from the way labour was going, that, in future, consideration would have to be given not only to the first efficiency of a pump, or to any other mechanical device, but to how much labour would have to be expended on it. Good working and long life were important in the old days, but would be even more so in future.

Mr. J. H. Walker (Mechanical Engineer, Beckton Works, North Thames Gas Board) thought that the author was, perhaps, unduly severe on the steam pump, which was probably still used more extensively than any other in the industry. Of the 400 pumps at Beckton works, to which the author referred, over 100 were steam pumps.

Advantages of Steam Pumps

The steam pump had certain advantages which should be borne in mind. The first was when a viscous fluid had to be pumped a long way. Many years ago an electrically-driven reciprocating pump was installed at Beckton to deliver tar to the products works half a mile way. There was no way of starting this pump, because it was not possible to set in motion a long line of viscous fluid. The motor tripped out on overload or the end of the pump casing was blown off, and the relief valve did not help in time. The problem was overcome by installing a steam pump of the same size. Today a hydraulic coupling might be used on the motor, though Mr. Walker had never heard of a coupling being used for that purpose.

The second advantage was that it was so easy to control the speed of a steam pump by automatic means. The level in the tank could be controlled by a float valve or the pressure by a pressure governor. Third, there were no complications with flameproofing in dangerous areas, as with electric pumps. A fourth advantage, which appealed to him as a practical man, was that the steam pump was so flexible that one could have numbers of identical pumps doing numbers of different jobs; thus spares could be reduced to a minimum.

Mr. Walker admitted that these steam pumps were very inefficient, but many of those at Beckton worked for only a few hours a week, so that efficiency was of secondary importance. It was very difficult to make out a case for their replacement, bearing in mind the cost of electric switchgear and cabling and remembering, too, that the steam services which fed them were used for other purposes as well. Of course, exhaust steam was used wherever possible. The centrifugal pump, on the other hand, had to be very carefully chosen for its purpose. It had to be large enough for its maximum duty, but the effect of varying quantities pumped had also to be considered, as the author pointed out. Not long ago a two-stage pump was put in at Beckton to supply water to an area of the works, and 200-ft. head was required, but at 15% of full load the pressure went up to 300 ft. and burst the cast iron delivery main. This emphasized the importance of the slope of the pressure/quantity characteristic curve.

He said that he shared the author's preference for the end inlet single-entry pump with overhung impeller, particularly in the smaller sizes. An obvious point was that there should be an easily removable length of pipe, preferably a bend, on the inlet to the pump, between the inlet flange and suction valve, so that the pump could be dismantled for maintenance without interfering with the whole of the pump suction.

Self-priming Pumps

The author did not mention the self-priming pump, although a good deal was seen of it in gasworks, in its use by civil engineering contractors for draining their excavations. Mr. Walker believed that there was scope for it in the gas industry in permament installations to empty sumps and drainage pits; this was often done by steam jets. These pumps were not very efficient, he said, but they were cheap and spares were easy to get; also they were reliable. Another type was the diaphragm pump which the civil engineering contractors used, but he did not think that this had much application in a gasworks, except for excavations. There were, however, small pumps working on the same principle, often with a variable stroke, which were used, for example, for dosing and purposes of that sort. At Beckton they used them for handling gas oil which had been used for naphthalene washing. Originally the diaphragms were made of Neoprene rubber, but this failed after a few weeks, probably due to benzole in the gas oil. Poly-thio-urea-ethylene (P.Th.E.) was then tried and was very satisfactory. These pumps had no glands and maintenance had been negligible.

Mr. Walker thought that the main conclusion to be drawn from this paper was the need for co-operation between the user and pump maker. There was a real danger of the engineer specifying a margin on top of the pressure and quantity which he estimated he needed, so as to be on the safe side, and then the pump manufacturer, for the same reason, recommending a larger motor than was theoretically necessary. The resulting inefficiency could be avoided by closer co-operation between the two parties.

Mr. F. A. B. Andrews (W. H. Allen, Sons & Co., Ltd.) said that the specific speed of centrifugal pumps was referred to in the paper in terms of revolutions per minute, and he thought that it was possible that the uninitiated might be led to infer from this that specific speed was a rate of movement. He agreed that the author mentioned that it was an index of the impeller type, but this was a point worth consideration.

Specific Speed

It should be noted that when dealing with multi-stage pumps the specific speed was calculated on one stage only, and the head must therefore be divided by the number of stages. Thus, a five-stage pump delivering 200 gal. per minute against a head of 200 ft. would have to be treated as a single-stage pump delivering the same quantity against 40 ft. head. For truly comparable results it was advisable, when calculating the specific speed of double-suction pumps, to use the quantity per 'eye' (the inlet of the impeller), or—*i.e.*, half the total quantity discharged. The specific speed thus obtained was then on the same footing as in the case of single-suction axial flow and screw pumps. Before the term 'specific speed' was recognized for rotakinetic pumps the type of impeller could be visualized by relating the width of the impeller at the outlet to the outside diameter, and also by taking the diameter of the 'eye' in relation to the outside diameter.

Mr. Andrews referred to a new development in connection with centrifugal pumps, to combat the trouble experienced by erosion and corrosion when dealing with estuary water or sea water, which, in certain cases both on the South Coast and in the Thames, had caused consternation among users. The present-day practice was to line the pumps with Neoprene. The first operation was to sand-blast the surfaces to remove all scale and expose the base metal. Two coats of a special primer were then applied, the first as a rust inhibitor and the second as a bonding medium between the metal surfaces and the rubber coating. The Neoprene coating was then sprayed on, each coat being approximately 0.004 in. thick, until the desired thickness was obtained, each coat being applied either after 30 minutes or after the preceding coat was tack-free. The coating, however, could not be used when the temperature of the liquid exceeded 150°F., and it was not suitable for water containing chlorine.

The Author's Reply

Mr. L. J. Clark, replying to the discussion, said he would like to thank Mr. Birks for his remarks. He had put them on the right track here by saying that if they could improve the basic efficiency of the works they were making an improvement for all time. So much work in recent years had been diverted to alternative fuels and materials in order to provide flexibility, and this had involved economic problems, but, as Mr. Birks rightly pointed out, they had to keep an eye on the efficiency. With regard to steam jets, he wished he could have said that all steam jets were dead years ago, but that would not be telling the truth. He agreed with Mr. Birks that they should be regarded with horror.

Mr. Clifford Howl mentioned many valuable points which he had omitted from the paper and had added considerably to its value. Both he and Mr. Walker still had a soft spot

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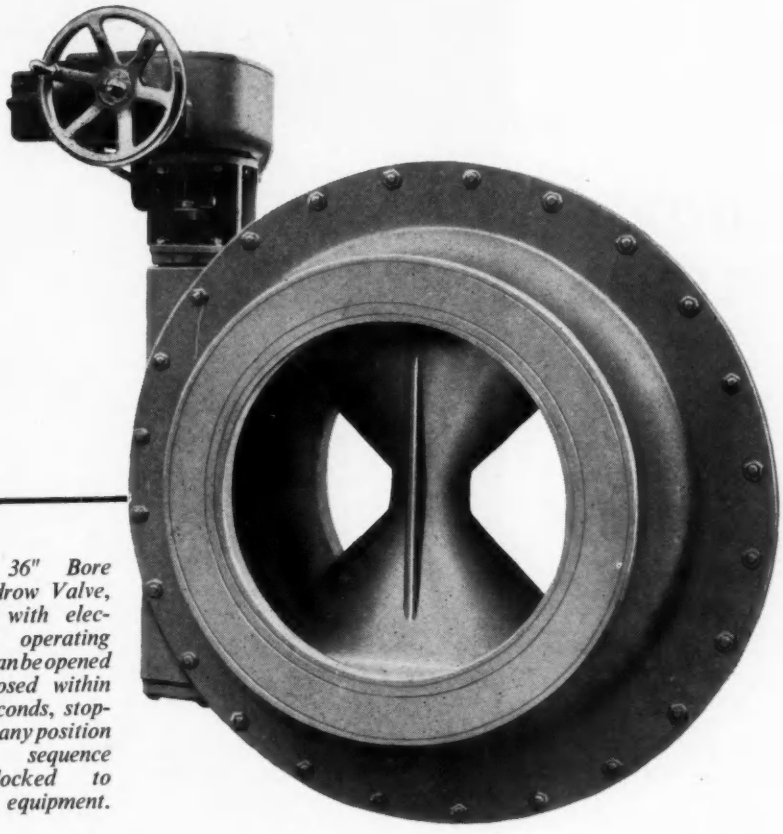

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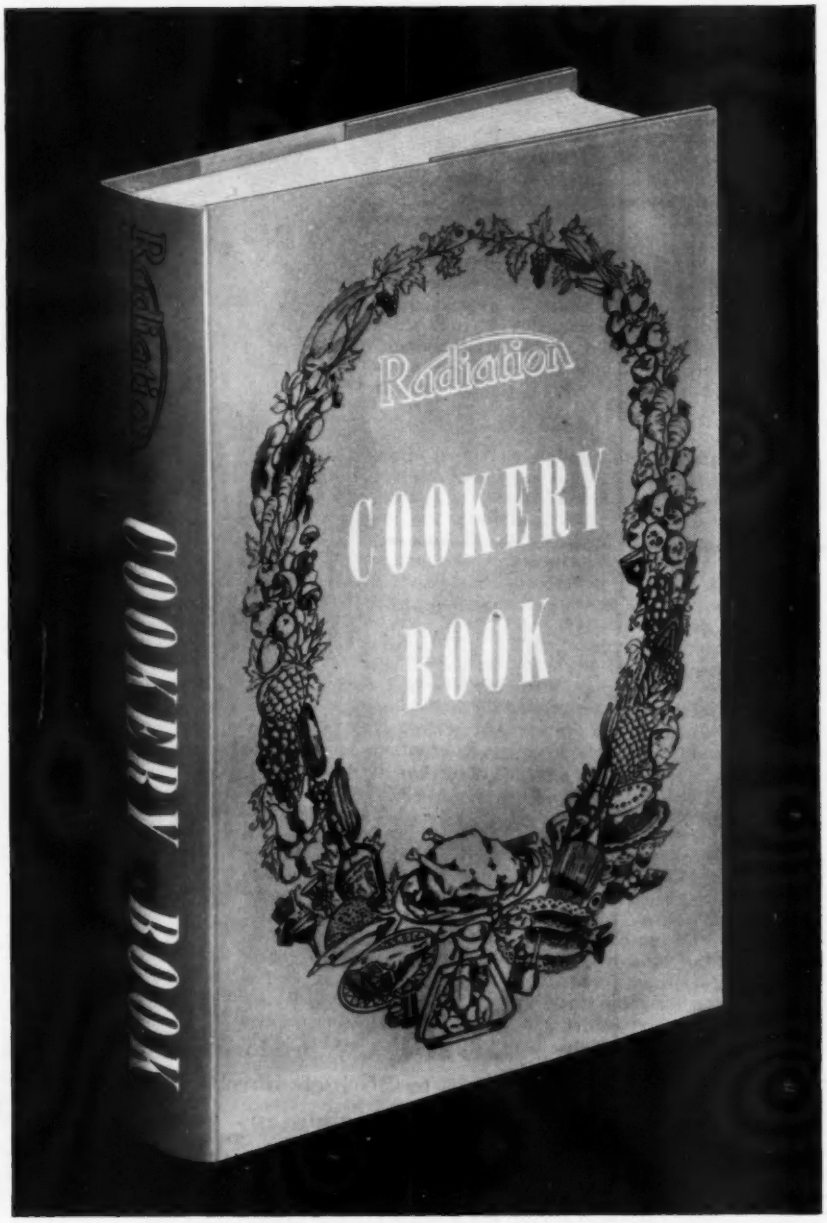

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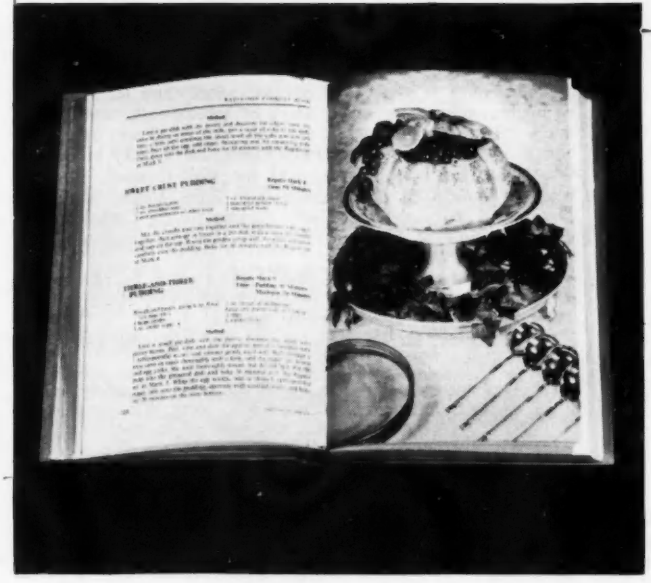

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for the steam pump. However, it was usually possible to do almost any job that the steam pump could do by other and more efficient means. Mr. Walker mentioned fluid couplings. They had been used in conjunction with reciprocating pumps, and they worked quite well.

Mr. Andrews had put him right on the question of specific speed. He (Mr. Clark) had been guilty here of contravening what was accepted parlance as regards specific speed. Taking the academic point of view he was probably right in referring it to revolutions per minute, because it was defined as the speed at which an impeller would have to run to give 1 gal. per minute against a head of one foot, and that was expressed in revolutions per minute.

On the other hand, in order to avoid confusion with the actual speed of a pump he thought that it was customary to leave out the reference when referring to the actual figure.

Mr. Andrews had made a useful reference to the use of rubber in pumps. He would like to have said more about some of the applications of rubber in pumps handling gritty materials, where he had found it quite satisfactory.

GAS WATER HEATING: A PRACTICAL APPROACH

Discussion on the paper presented to the Institution of Gas Engineers annual meeting by W. R. H. Lorimer, a summary of which was published in the 'JOURNAL' of June 15, pp. 777-778.

MR. C. WADSWORTH (Northern Gas Board) congratulated Mr. Lorimer on his paper. His approach to the subject was interesting, and he rightly emphasized the contribution which could be made by the practical man who was, in fact, the person in direct contact with the job in hand and the consumer. The technician could, in the laboratory, develop appliances for a specific need, but unless they were installed correctly, his time had been wasted and the industry in general would suffer.

The Frozen North

A significant statement was that 'practical experience in the North had proved it necessary to depend on the storage system if really hot water had to be guaranteed for all domestic purposes at all times throughout the year.' That statement was undoubtedly based on the author's very wide experience of conditions obtaining in the North of England, and suggested that instantaneous appliances did not fulfil his requirements. His (Mr. Wadsworth's) experience of large instantaneous appliances—and in particular the multipoint water heater—bore out the author's assertions. It was due to the rather colder water supplies obtaining in the North. This meant, practically, that the maximum temperature rise of existing type multipoint water-heaters was perhaps inadequate, and appliances with a rather higher temperature rise was necessary for the Frozen North.

Mr. Lorimer next made reference to the 'Northern' sink water heater, an appliance with which the speaker had been closely connected since its introduction. Since the introduction of this heater about a year ago, some 12,000 had been installed. These had given virtually no trouble of any kind, the only difficulty being experienced with the broken feed arrangement, with which, owing to the recent change in the Ministry of Health Model By-Laws, they were now able to dispense. Each of the 12,000 appliances installed was giving an annual increase in gas consumption of between 16 and 20 therms, and the resultant publicity from its introduction had resulted in an increase in sales of existing types of water-heaters by some 65%. Incidentally, the market for this appliance was a new one, each of the 12,000 supplied being installed where previously the only means of obtaining hot water had been the kettle on the cooker hotplate.

Copper and Sulphur

Mr. Wadsworth did not propose to comment on Mr. Lorimer's 'Selection of Appliances' and 'Installation' sections since much had already been published on these lines. Maintenance was, however, another matter, and in some types of appliance represented a considerable problem. He referred, of course, to any appliance using copper, protected or not, as the heat-exchange medium. Since with copper heat-exchange units maintenance was essential, he could only plead for some reduction in the sulphur content of town gas if the problem were to be largely overcome. Regarding their competitors, Mr. Lorimer could have devoted a little more space to these and their comparisons with gas equipment—in particular the practical approach to installation of a gas water-heater as an alternative to an electrical immersion heater. Perhaps Mr. Lorimer would give his observations on that point

Mr. G. E. Haddon (Distribution Engineer, Stockton-on-Tees) claimed that the need for combining practice with theoretical knowledge was never more essential. 'We are in the age of atomic energy, electronic flame failure devices and turbo-jet planes; and advanced thought and action applicable to gas water-heating is inevitable and necessary.'

In addition to those most worthy gas textbooks, 'A Manual of Gas Fitting' and 'Domestic Utilization of Gas,' he considered that a standard textbook on hot water and central heating should be in the possession of all who were engaged in the water-heating field. In retrospect, his own interest and knowledge in the hot-water field had been assisted many years ago by practical contact with one of the well-known early pioneering appliances known as the 'B.T.U.' circulator, made by John Wrights of Birmingham, and he had been further stimulated by possession of a booklet from the same firm on 'Apparatus for Domestic Hot Water Supply,' the principles of which applied equally today.

Days of Opportunity

To take advantage of present opportunities and create others for the future, they were assisted by the Food and Drugs Act, 1938, the Housing Acts, 1949 and 1954, the Beaver Report and a stirring of public opinion on the evils of atmospheric pollution. These should make much easier the development of gas water heating. Concurrently all forms of publicity should be increased. Water heating not only had special spring and summer seasonal appeals, but an all-the-year potential based on circumstances and opportunities. In addition, attractive long-term hire purchase and realistic simple-hire terms, based on decreased charges, say in steps of three years, were advocated. Research should also be fully expanded and co-operation assured between the manufacturers, the Society of British Gas Industries, area boards, and the Gas Council through Watson House and other channels. Sales staffs should be encouraged to undertake studies leading to the Certificate of the Institution of Gas Engineers in Gas Salesmanship and Consumer Service.

With regard to installation, the position could be adequately covered by ensuring that all utilization personnel were trained and qualified by the well-known courses.

In conclusion, Mr. Haddon offered the following points for consideration:

(1) Appliance standards to be in the order of safety, effectiveness, efficiency, appearance, long life, consistent trouble-free performance, and ease of maintenance.
(2) Wherever possible, appliance outer casings should completely envelop the interior build-up and all controls.
(3) Makers' names and symbols to be omitted from the front casing of appliances.
(4) Reduce hourly by-pass rate or eliminate by development of cold catalyst or electrical ignition.
(5) Reduce hourly maintenance rate, or adopt on/off control and quick recovery.
(6) Adopt balanced or built-in flues where applicable.
(7) So develop design and performance that servicing is virtually restricted to consumer maintenance.
(8) Re-introduction of some modern form of gas immersion water heater.
(9) Virtual elimination of organic sulphur from the gas distributed to consumers.
(10) Acknowledgment is made to manufacturers for the excellence of literature distributed, much of which is of a high technical standard. The wish is expressed that this will continue and even expand as circumstances require.

Finally, he considered the paper had enhanced the prestige

of the Northern Junior Gas Association, and he congratulated the author on a clear thinking paper.

Mr. C. H. Purkiss (Watson House), wished to comment briefly on three particular points. First, the author devoted one section of his paper to the selection of appliances. The Gas Council's Approved List included 75 domestic water heaters (excluding wash boilers and machines), and it was important to appreciate and apply the particular features of each. The list, to which additions were frequently being made, was not merely a list from which to select at random, or on price alone. Some appliances had particular features in service, such as rapid heating-up, or ability to deliver boiling water, or particular ease of maintenance; others catered for local conditions, and might be especially suited for low water pressures, or for very hard water, or for places where no cistern supply was available. Others again might have the merit of offering a limited service at low capital or installation cost. There was no one appliance to suit all situations.

Second, the author rightly emphasized the importance of adequate ventilation and the difficulty often encountered in providing satisfactory flues. Attention was drawn once again to the excellent chapter on ventilation in the Code of Functional Requirements of Buildings, and to the Code on Flues for Gas Appliances. Many difficulties and complaints might be avoided if the elementary principles laid down in these documents were fully appreciated. This further confirmation of problems with flues and ventilation pointed once again to the advantages of balanced flue appliances; there seemed little doubt that that principle could profitably be applied further in the domestic water heating field.

Again, Sulphur

Finally, the author dealt with the maintenance of water heaters. This was bound up to a considerable extent with the sulphur problem, to which Mr. Horsfall had drawn attention earlier. One of the principal objectives in appliance development was reduction in maintenance and the provision of improved facilities for such maintenance as might be necessary. The use of corrosion-resistant materials, the filtering of pilot gas supplies, proper heat treatment of bimetallic strips, new packing materials for the glands of water taps and automatic valves—all these and other developments were gradually helping to reduce maintenance, and there were some appliances which could now be left for at least three years without attention. It was the constant aim of the technician to help the 'practical' man by giving him a wide variety of appliances, easy to install, and which would give long and trouble-free service.

Mr. Lorimer Replies

Mr. W. R. H. Lorimer, replying to the discussion, said Mr. Wadsworth had suggested that more space might have been given to their competitors. He was absolutely right; but many practical men found that to put thoughts on paper clearly and adequately was difficult. That explanation was his defence.

On the question of the justification of the installation of a gas water heater in place of an immersion heater, in his area installation costs were higher, but with running costs gas was on the right side. So far as fixing the appliance was concerned —and he spoke as one who had been putting holes in cylinders for the last 50 years—there was no difficulty so far as the appliance and the installation of gas were concerned; the trouble was with the flue. This brought him back to the need for co-operation with everybody concerned. Gas had circulators which could do the job, and if fixed correctly they gave little trouble. Some were good and some were not so good. Therefore, when they could ensure an effective flue—and that was not impossible, with the co-operation they should enjoy—they could look forward to the time when they could fix a circulator and hold their own against the electrical industry.

Technical Literature

He agreed wholeheartedly with Mr. Haddon that fitters should have technical books. His Divisional Manager had always insisted on that; but unfortunately some of them would not bother to read them. Regarding the 'B.T.U.' circulator, he knew of some which even today were doing a good job, and with less maintenance than was needed for some modern appliances. Regarding examinations and their importance, 45 years ago for three years he had travelled 80 miles three times a week to take the City and Guilds hot water course.

The **President** thanked Mr. Lorimer for a delightful introduction and winding-up to a very pleasant paper, which had added lustre to the Junior Gas Associations.

STATIC VERTICALS—From p. 908

which two, and in some cases three, cold repairs, consisting of renewal of the lower 10 ft. of silica. had been carried out. During the complete resetting a major alteration was made, constituting a complete difference from the Southampton plant, by the addition of front-wall single-pass recuperators. The single line bench made this possible and resulted in a saving of about 1.5 cwt. of producer fuel per ton of coal carbonized, equal to some 2,200 tons of coke per year on an annual quantity of nearly 29,000 tons of coal carbonized. It was now possible to operate the bench fully on three producers, whereas previously four were needed. When the front-wall recuperators were added the point of producer gas entry was altered from the non-producer side, which was reached by means of cross-under flues, to the producer side. Control of setting temperatures had thereby been greatly improved and a serious 'hot spot' virtually eliminated.

Similar Remedies

The Cambridge experience of cooling chamber construction, bottom castings and cooling chamber linings, was strikingly similar to that at Southampton and similar remedies had been applied successfully. When cracked bottom castings first occurred, considerable trouble was caused by air in-leakage which, in turn, intensified ash erosion in the lower part of the retort by accelerating ash release from the coke due to combustion.

When cast iron liners were first introduced into the extractor castings further air in-leakage occurred, due to the frequent breaking of the cast iron bolts used to secure them. Substitution of heat-resisting steel bolts overcame this difficulty. Air in-leakage through the coke discharge doors due to erosion of the faces by the coke discharges and corrosion by acid steam condensate had been eliminated by changing the jointing material and in particular by protecting the door faces by metal spraying with nickel. He wished to pay tribute to the interest and co-operation of the contractors in studying and overcoming the difficulties which had been experienced. That co-operation was in the highest tradition of the relationship between the industry and the contractors.

Mr. Burgess Replies

Mr. H. G. Burgess, in reply to the discussion, said he was pleased to hear that Mr. Whitehead shared their confidence in the future of the static vertical retort. He would like to give Mr. Finlayson's comments a little thought before replying to them. He felt, however, that this was an opportune moment to endorse Mr. Winch's tribute to the Woodall-Duckham Company for co-operation in solving their problems. Mr. Winch had made some interesting comparisons between experience at Cambridge on the only other static plant in this country and their experience at Southampton. Those experiences were so similar that it was some relief to know that their difficulties and problems were not due simply to themselves. It was interesting to learn that at Cambridge it had been possible to install front-wall recuperators and at the same time so rearrange the flues as virtually to eliminate the hot spot.

A pocket-sized edition of the British Road Tar Association's Tar Spraying Indicator (6s. 6d. post free from 9, Harley Street, W.1) is now available. It is made in a plastic material and contains all the recommendations for tarspraying which are found in the revised Road Note No. 1. It enables information regarding the rate of spread of the tar and of the chippings which should be used under various conditions to be found easily and quickly.

South Western Coke Delays

Arising from delays in coke deliveries during the very cold spell in February, the South Western Gas Consultative Council at Taunton on June 2 was asked by its Plymouth Local Committee to recommend to the Gas Board that unless it was in a position to supply adequate quantities of suitable coke next winter further publicity should not be given to the sale of coke-burning appliances.

Delays of three to four weeks were reported in coal and coke deliveries in most parts of the country.

It was stated that the Gas Board was arranging transport and storage to ensure delivery within seven days of receiving an order, unless exceptional weather made that impossible.

Members urged that to achieve smokeless zones in the country, coke-burning appliances must be encouraged.

The Council approved an amendment recommending the Gas Board to take every possible step to supply adequate quantities of suitable coke next winter, so that the sale of coke-burning appliances would not be adversely affected.

Because of the risk of bogus meter readers and other undesirable persons being admitted by householders, the Consultative Council wants the Gas Board to investigate the whole question of how its employees can best be identified at the homes of consumers.

The Council passed a resolution to this effect when its Deputy Chairman, Miss J. Stephen (Bristol), referred to Press reports of attacks on women living alone by persons who professed to be electricity or gas meter readers. She said people had asked her why meter readers no longer wore uniforms. An agreement had been made between the trade union and the Gas Board that these should eventually go out and there was considerable disturbance in the minds of people that these attacks should be possible.

It was easy (said Miss Stephen) for a crook to copy a badge or forge an identity card, but not so simple to get a uniform. Some time ago the Council accepted the Board's explanation of the change, but she wondered if it would allay public fears, especially those of lonely women, if they reconsidered the question of the uniform. Most public services had one and she did not understand why, since nationalisation, the gas and electricity boards had done away with it.

Mr. W. J. Baker (a member of the South Western Gas Board, said there were 260 meter readers in the area; before nationalisation about 80 had uniform. The Board did not really mind whether all or part had uniforms, but the cost for all would probably be £2,000 to £3,000 a year. Those who had not been accustomed to wearing uniform refused to wear it and the trade union was inclined to support them. The alternative was an identification card with the man's photograph and the Board's seal, but it could quite easily be copied by a crook. No method of identity would completely overcome the difficulty. The usual type of uniform, a double-breasted blue suit and peak cap, could also be copied. It would cost £30,000 a year to put into uniform all the Gas Board employees who entered consumers' homes.

One member suggested a badge with a personal number.

Councillor T. H. Martin said he knew of the controversy in the trade union, but as a public service they wanted to protect the public and allay alarm as much as possible.

Miss Stephen said there must be a good basic reason why the uniform system in so many spheres had continued down the years.

Councillor M. A. T. Ashton proposed, and it was unanimously agreed, that the Gas Board should be asked to investigate the whole question of identifying their meter readers, collectors, and other employees to the public.

NORTHERN GAS WASHER CAMPAIGN

The theme of this window is 'Gas Washers Boil and Boil Quickly.' It was shown in conjunction with an extensive washer campaign carried out by the Northern Gas Board. To give the impression of boiling a constant pillar of soap suds was maintained on each of the three central washers. The card in the foreground carried four pieces of the same material, one stained, one washed at 100° (approximate tap temperature), one washed at 150° and the last piece had been boiled, thus showing the great difference in the whiteness obtained by boiling. The window attracted much attention and excellent results were obtained from the campaign.

The Sauchiehall Street Showrooms of the Scottish Gas Board in Glasgow continued their series of excellent window displays in May with an Ascot show which used as its theme 'Ascot Water Heaters Never Run Cold.' A window layout incorporated three sinks into which Ascot models were running a continuous supply of hot water giving all the advantages of movement and factual presentation to support the claim. Models on show covered a range sufficiently wide for individual and varied purposes. The showroom is also giving publicity to the 'Bride of the Year' scheme, using posters and other publicity material.

Scottish Bowling Club

The Scottish Association of Gas Managers Bowling Club played the Scottish Gas Board (Glasgow Division) at Glasgow on June 11. The result was—Glasgow Division 161 shots: Scottish Association 80 shots. Six rinks took part and a most enjoyable afternoon was spent. The Scottish A.G.M. Bowling Club entertained their opponents to tea in the clubhouse after the game.

Mr. W. T. Gilchrist, deputising for the President who was absent due to illness, reported the result of the match and said how pleased they were with such an enjoyable afternoon, but regretted that once again the Gas Managers' Club had to admit defeat. Mr. Armour, President of the Glasgow Division Club, replied and expressed appreciation on behalf of his Club for their hospitality.

Mr. D. F. Young, Hon. President of the Glasgow Welfare Club, in a few words said how delighted he was that the Scottish Association of Gas Managers' Bowling Club had again visited their green.

Simon-Carves, Ltd., have opened new Indian head offices at Standard Buildings, 32, Dalhousie Square South, Calcutta 1, which will be the headquarters of the resident engineering staff which has been maintained in India for over 40 years. The new office will be under the charge of Mr. N. A. Ross, Simon-Carves Manager in India. The existing Simon-Carves office at Jamshedpur will continue as a site office.

Willoughby Lane Ceremony

SIR JOHN STEPHENSON, C.B.E., Chairman of the Eastern Gas Board, on June 17 inaugurated the extensions of the Willoughby Lane, Tottenham, works described in last week's 'JOURNAL' (pp. 829-834). In doing so he paid special tribute to Sir Harold Smith, Chairman of the Gas Council, for many years Chief Engineer and later a Managing Director and Deputy Chairman of the former Tottenham and District Gas Company, and Mr. E. C. Woodall, Chairman and Managing Director of the Company prior to vesting date, and now a member of the Eastern Gas Board. He also praised the work of the contractors, notably the Woodall-Duckham Construction Co., Ltd., Peter Lind & Co., Ltd., and Hugh Wood & Co., Ltd. In declaring the new plant open, Sir John unveiled a commemorative tablet in the power house.

Sir Harold Smith followed with warm commendation of the work of Mr. E. O. Rose, Divisional Engineer, and Mr. W. T. J. Gedge, Constructional Engineer—work which he said would stand up to the most serious criticism.

After a tour of inspection the visitors met for tea, at which Mr. J. H. Dyde, Deputy Chairman of the Eastern Gas Board, said the occasion afforded the Board an opportunity of indicating to its consumers through their chief citizens (the Mayors of Tottenham, Edmonton, and Enfield were among the guests) evidence of its virility as an industry and the desire of the Board and its technical officers to take advantage of the latest techniques aimed towards the improvement in the efficiency of gas and coke production.

Sir John Stephenson, C.B.E., unveils the commemorative plaque in the new power house at Willoughby Lane.

Mr. Henry Jones, replying for the guests, said this was probably the first works so deliberately designed to meet the growing need for a good open fire fuel—designed long before the Beaver Report made its appearance.

The proceedings ended with the presentation of a pair of ivory-backed hairbrushes to Sir John Stephenson as a memento of the occasion. The presentation was made by Mr. Dyde.

On the left are Sir John Stephenson, F. T. Brookes (Divisional General Manager, Tottenham), L. F. Garner (Willoughby Lane Works Engineer), Sir Harold Smith (Chairman of the Gas Council), and Mr. Henry F. H. Jones (his Deputy Chairman). On the right, inspecting the coal handling plant, are J. Simpson (Woodall-Duckham Construction Co., Ltd.), J. Hunter-Rioch (Divisional General Manager, Cambridge), F. M. Birks (Deputy Chairman, North Thames Gas Board), and E. O. Rose (Divisional Engineer, Tottenham).

Two groups of visitors on the tour of inspection after the inaugural ceremony.

COMPANY NEWS

AUSTRALIAN GAS LIGHT

The Directors of the Australian Gas Light Company report that the net profit for the year ended December 31, 1954, amounted to £317,816. The amount brought forward from the profit and loss appropriation account was £260,645. An interim dividend of 3% in respect of the half year ended June 30, 1954, accounted for £145,800 and payment for the half year ended December 31 last was recommended at 3% on the 'A' and 'B' shares issued prior to October 14, 1954, and on the 500,000 'A' shares issued on October 14, 1954, a dividend at the same rate in conformity with the conditions of such issue. The balance to be carried forward was £280,623.

CAPE TOWN

The Cape Town and District Gas Light and Coke Company shows in its accounts for the year ended December 31, 1954, a credit balance carried down, after charging debenture stock interest and depreciation, of £27,964. Adding to this the amount of £7,444 brought forward from last year's accounts brings the total available to £35,408. Interest on funding certificates, dividend paid on preference stock and debenture sinking fund have been charged; after allocating the provisions as set out, the directors recommend the payment of a dividend for the year on the ordinary stock of 8%, less tax, amounting to £4,400, which will leave a balance of £8,071 to be carried forward.

MONTEVIDEO GAS

The directors of the Montevideo Gas and Dry Dock Company in their report to the 83rd annual general meeting, announce that the net profit for the year, after tax, amounts to £40,424. After various additions and the deduction of 6% debenture sinking fund (£7,267), the balance available is £90,519. The directors recommend a transfer to contingencies and taxation reserve of £40,000 and a dividend for the year of 5% on the ordinary stock, less tax. The Chairman, Mr. G. D. Paton, said in his statement that the effect of increased costs of wages and salaries in 1954 had been to make the Company's 'fundamental activity'—the manufacture and distribution of gas—actually unprofitable. 'On the other hand,' he added, 'receipts from ancillary activities continued at a high level, particularly in the case of sales of appliances where there was a large increase in both volume and value.'

THOMAS DE LA RUE

Group profit of Thomas De La Rue & Co., Ltd., for the year ended April 2, before charging United Kingdom taxation, was £834,526, against £525,658 for the previous year. Taxation applicable to the year's profit was £547,729, against £360,896. Dividend is being increased from 20% to 30%. The proposed final rate of 22% compares with a first and final of 20%. Cost of the year's dividend is £157,883 in contrast with £101,860. A special credit addition is £4,344 dominion tax repayment. It compares with £60,000 United Kingdom tax over-provision and £35,000 dominion repayment. General reserve is brought up to £1 mill. by the allocation of £150,000. Profits, less losses, on sale of certain fixed assets and trade investments together with a capital payment received under a licence agreement, have been carried to capital reserve. Against this reserve has been charged the writing-down of the book value of certain fixed assets and investments in subsidiaries.

JOHN THOMPSON

Gross trading profits of John Thompson, Ltd., for 1954 were £2,049,591, an increase of £576,831, or 39%, over the previous year. Net profits, after paying £954,464 in taxation and £250,052 for depreciation and special depreciation reserve amount to £777,586 as compared with the previous year's £413,168. It is proposed to pay a final dividend of 10%, making 20% for the year, plus a bonus of 5%. Mr. E. W. Thompson, Chairman, in his statement with the accounts, says the various group companies each and all did their share during the past year and in nearly every case output was increased above the 1953 level. A group methods and works study team has been set up and has already proved its value. Important production problems in several works have been assisted by the careful study and analysis of the team, whose scope and size will be extended as necessary. Output for the home companies so far this year shows a substantial increase over the corresponding figure for 1954. At present the amount of orders on hand is approximately £38 mill., not an excessive figure when considered in relation to the output of over £17 mill. last year.

RAMS Golfing Society

The RAMS Golfing Society held its annual open meeting at Richmond Golf Course, Sudbrook Park, on June 7, when members and friends enjoyed an excellent afternoon's golf in fine weather. The result of the games, played under Stapleford rules, was as follows: 1st. S. E. Balsom (Luton), 36 points. 2nd. H. Barratt (Hitchin), 35 points. 3rd. R. G. Payne (RAMS), 33 points. Prizes for the best first half went to S. E. Balsom and L. C. Coleman, (Ipswich). A consolation prize was awarded to K. Rees (Watford).

The RAMS Golfing Society is presenting a challenge cup for competition between golfing societies within the industry. The cup will be competed for annually, and for the purpose of the 1955-56 competition, matches already played since April 1 may be included. Competing societies will agree as to the form the competition between them shall take and two points will be awarded for a win and one point for a draw. Three or more fixtures for any one competing society are necessary to qualify for the competition and points gained against societies which do not themselves qualify will not count. Societies interested are invited to communicate with J. Elliot Clark, Hon. Secretary, RAMS Golfing Society, 62, Mangrove Road, Hertford.

Centenary Gala.—As part of the Centenary celebrations of Robert Dempster & Sons, Ltd., a sports gala for employees and their families was held at the sports ground adjacent to the works, on June 11. Mr. B. C. Morton, Managing Director, opened the proceedings by welcoming all those present and referring to the emphasis which had been given to children's entertainment. The Dempster Ambulance Shield and Rose Bowl were presented to the winning team of the St. John Ambulance Brigade by Mrs. Morton, wife of the Managing Director.

Fuel Efficiency Exhibition

The third Fuel Efficiency Exhibition at the City Hall, Manchester, from October 12 to 22, under the auspices of the Combustion Engineering Association and the National Industrial Fuel Efficiency Service, will show the latest equipment and techniques in the field of industrial fuel efficiency. Unlike the two previous exhibitions, the show will be devoted exclusively to industry.

The products and methods of nearly 100 manufacturers and organizations concerned with the industrial application of fuel, from all over the country, will be gathered under one roof to show and demonstrate the largest number of fuel saving exhibits ever to be collected for this purpose.

Atomic energy—perhaps the ultimate answer to all fuel problems—will find a place in the exhibition for the first time. The Atomic Energy Authority has booked space for exhibits that will show the strides made towards the industrial application of nuclear power. The Central Electrical Authority has entered a demonstration of how the newest methods of fuel efficiency are applied in the generation of power, and some of the latest appliances will be shown by the North Western Gas Board.

Edwards High Vacuum, Ltd., is the new name of W. Edwards & Co. (London), Ltd. Since the early war years the Company has endeavoured to make the name of 'Edwards' and 'High Vacuum' synonymous, but it feels the time has come to incorporate the two in view of the new fields of industry and research into which its products go. Its export business has also grown and to foreign buyers the old name did not convey the fact that the Company manufactures vacuum equipment. The new Crawley factory covers a much larger area than previous premises in London, and a further 40,000 sq. ft. of factory space has been added to the rear.

NEWTON CHAMBERS ENTERTAIN MANCHESTER JUNIORS

Sir Harold West, Managing Director, chats with Mr. A. H. Barrington (President of the Manchester District Junior Association of Gas Engineers), some of whom are pictured here with Local Directors of Newton, Chambers & Co., Ltd.

About 100 members of the Manchester District Junior Association of Gas Engineers visited Newton, Chambers & Co., Ltd., at Thorncliffe, on June 15. Perfect weather added to the enjoyment of all.

On arrival members were shown the 'Thorncliffe Exhibition' and a film which outlined the scope and history of the Company. After lunch, which was served in a marquee on the lawn in the grounds, Sir Harold West (Managing Director, Newton, Chambers & Co., Ltd.) welcomed the guests and particularly Mr. C. C. Wood (Divisional General Manager, Sheffield, and Rotherham Division, East Midlands Gas Board). He said that the last Manchester Junior visit was in 1948 and he was glad to see them back again. Referring to present day strikes, he said wise administration now and many years ago had prevented them hitting the gas industry. A great part of the education at Thorncliffe was devoted to tradition and working care, and it was as well for the young man today to remember most troubles had happened before. Sincere and efficient management got a lot from employees and the need for training in management was important.

The interesting problem, Sir Harold went on, was how to establish sincere and efficient management. He emphasized sincerity, because he had found that one could be forgiven a lot if one could convince people of real sincerity. However good management was, there were always cases where things could go wrong, but much could be forgiven if it was really believed that management was sincere.

Speaking of the importance he attached to the work of the Junior Associations, Sir Harold said the important thing to remember was that they must ensure that management throughout the country took an interest in reading up both the technique of management and the technique of the job. He thought that the system of grading by professional institutions was something particularly British and encouraged efficiency among management at all levels.

The exhibition which members had seen previously was designed to explain the general scheme and business of the Company and was open to employees and their friends. It enabled them to see the other man's job and not just their own.

Mr. A. H. Barrington (President, Manchester Juniors) said that it was apparent that youngsters were getting the right kind of training at Newton, Chambers. It was also a part of their 'terms of reference' in the Junior Gas Associations. He thanked Sir Harold West and the staff for their hospitality.

During the tour of part of the works, members started at the constructional shop of the heavy constructional department where they saw parts of purifiers, gasholders, tanks, steelworks plant and blast furnace plant being made and assembled. In the welding shop they saw the fabrication of various parts of the N.C.K. excavator and then to the machine shop and foundry, where among other things they saw the Redfyre taking shape.

Into buses and away to the excavator division where they saw the three sizes of N.C.K. excavator being assembled and rigged and finally watched the testing. Here they are given eight hours' digging prior to the final inspection.

After tea, Mr. K. E. Walker (Assistant Managing Director, Newton, Chambers & Co., Ltd.) and Mr. G. G. Ibbotson (General Manager, Heavy Constructional Department) said a few words, and Mr. Barrington proposed a vote of thanks for an enjoyable day.

Members then heard Mr. L. Potts (Senior Technical Assistant (Production), Technical and Planning Division, North Western Gas Board, read his paper on 'Observations on the Mechanism of Carbonizing arising from the Quenching of Continuous Vertical Retorts.'

Among the visitors were Messrs. T. W. Pickthall (Hon. Secretary), H. B. Gidlow (Hon. Treasurer) and C. H. Bamber, J. Hepworth, J. M. Lord, M. Redman, L. G. Townsend, and L. Potts (Members of Council).

George Wilson Presentations

It has become an annual event for the Chairman and Managing Director, Mr. W. D. Wilson, to present inscribed clocks to those employees of George Wilson Gas Meters, Ltd., who have served the Company for 30 years or more. The total has now reached the impressive figure of 22, of whom perhaps the best known would be Mr. F. C. Wilson, who has completed his 50th year, and Mr. D. C. E. Poole, another Director, with 45 years.

Mr. W. D. Wilson (left) making a long service presentation to Mr. G. C. Ball, the Company's Export Manager.

On the occasion of the annual dinner and presentation of cups and trophies to the winners of various sports competitions, held in the works canteen on June 15, the Managing Director again took the opportunity of making presentations to five such employees.

In a few words to those present Mr. Wilson said that of all the duties that could be performed by a Managing Director, there was no doubt that one of the most pleasant was the presentation to those who had served a company well and loyally for a great number of years. He remarked that as an infant with only 25 years service he felt humble in the presence of those who had already been with George Wilson Gas Meters for some years while he was still at school.

New Plymouth Tar Works Inaugurated

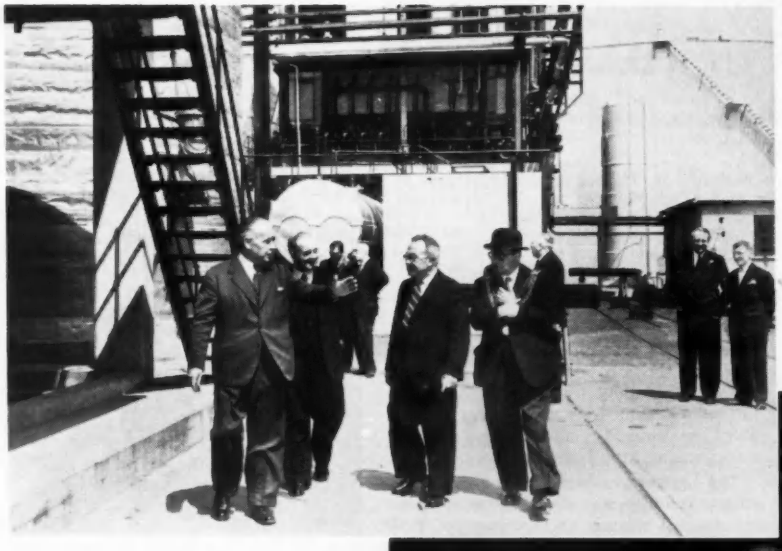
A distinguished company, including the Lord Mayor of Plymouth (Councillor Edwin Broad), Sir Colin Campbell (former Town Clerk of Plymouth), Mr. Lloyd Jones (present Town Clerk), the County Surveyors of Devon, Cornwall, and Dorset, and divisional and district surveyors, witnessed the inauguration at Cattedown, Plymouth, on June 21, at the invitation of the Chairman and Directors of Plymouth Tar Distilleries, Ltd., of the new tar works there, claimed to be the last word in technical efficiency.

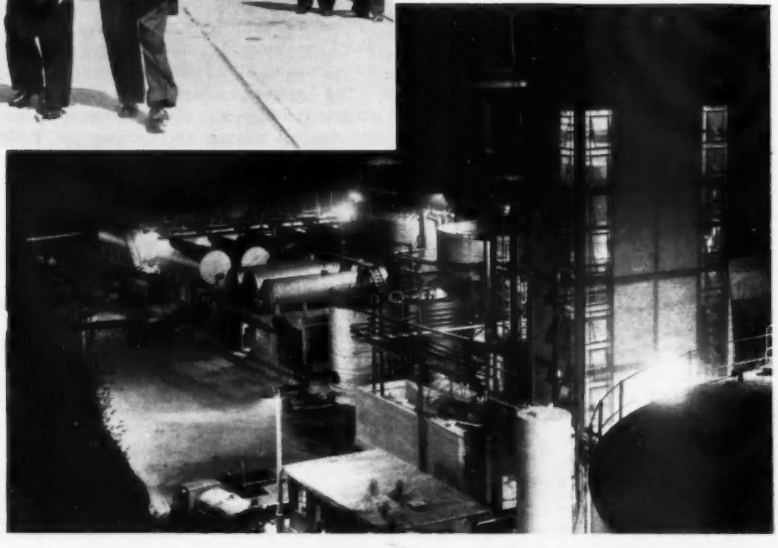
Fine weather favoured the unveiling of the commemorative tablet by the Lord Mayor and inspection of the plant by the visitors, who were guided round of tar to its primary products. The second stage will comprise a processing plant to be built later on the site of the older works. The new works are built into the quarry face, and many hundreds of tons of rock had to be removed to make way for them. This permitted the erection of two crude tar storage tanks, one for 1.5 mill. gal. and the other for 150,000 gal.

The LORD MAYOR said that tar was of exceptional importance and it was pleasing to him to take part in a ceremony which marked fruition after two years of hard work. After the ceremony he toured the plant in company with Mr. Chester, who showed him in one of the Gas Board, Plymouth Tar Distilleries, Ltd., and Burts and Harvey, Ltd. The Minister of Fuel and Power, Mr. Geoffrey Lloyd, in a letter of regret that important business detained him elsewhere, had said he welcomed the new venture and commended the co-operation shown between the Gas Board and the Company. Mr. Chester hoped the South Western Gas Board would have the pleasure of the presence of the Lord Mayor at the forthcoming opening of its Plymouth headquarters and showroom.

The LORD MAYOR, responding to the toast, said he was gratified that those who had such faith in the new venture had seen fit to locate it in Plymouth. Though the city was largely dependent for its prosperity on H.M. Dockyard the Corporation would like to promote other light industries as cushion against unemployment.

MR. W. HARRISS, a Director of Plymouth Tar Distilleries, Ltd., proposed





Mr. C. H. Chester, Chairman of Plymouth Tar Distilleries, Ltd., and of the South Western Gas Board, conducts the Lord Mayor (wearing his chain of office), Mr. E. Broad, and Mr. E. Lewellin round the tar works. Below is a view of the tar works by floodlight, reproduced by courtesy of A. Hornbrook, Plymouth.

it by members of the Company's staff. The stone which the Lord Mayor unveiled carried the inscription: 'Plymouth Tar Distilleries, Ltd. This plant was opened by the Lord Mayor of Plymouth, Councillor Edwin Broad, June 21, 1955.' On the other side, a few feet away, was a similar plaque bearing the inscription: 'This stone commemorates the inauguration of the new tar works site by the Lord Mayor of Plymouth, Alderman H. E. Wright, J.P., May 1, 1953.' With the Lord Mayor at the ceremony was Mr. C. H. Chester, C.B.E., Chairman of Plymouth Tar Distilleries, Ltd., and also of the South Western Gas Board, and M. C. Ab-der-Halden, of Nancy, France, whose father was the inventor of the process employed at the new works.

MR. CHESTER said the new buildings were the last word in technical development in the distillation of crude tar as made from gas manufacture, and its by-products were very important. The new buildings are intended to replace those nearby, which are to be partially reduced. The first stage of the building scheme encompasses the plant for the distillation offices a scale model of the works. The inauguration ceremony was followed by a luncheon at the Grand Hotel, over which Mr. Chester presided.

MR. CHESTER, in proposing the toast of the City of Plymouth, said the new buildings were the best examples he knew of private enterprise mixed quite freely and successfully with a publicly-owned service, and it was a result of co-operation between the South Western

the toast of the guests, mentioning among them Sir Colin Campbell, Mr. Lloyd Jones, Alderman Wright, a number of quarry owners, Mr. Whitehead (who was responsible for tar distribution throughout an area stretching from East Sussex to Land's End), Dr. Butler (Chairman of the Bristol and West of England Tar Distilleries), and Mr. H. H. Bates (National Benzole Company).

MR. A. ASHWORTH, County Surveyor

of Cornwall, responding, expressed a desire to see the same spirit in other quarters of getting things done as was exemplified in the fine works they had seen that day. He had been impressed with the great progress made by the Gas Board which had spent a great deal of money during the past five years on the re-organization of the numerous gas-works in its scattered area, and he wished that the same kind of wisdom could be applied to the modernizing of highways. The Board had spent something like £13 mill. in the five years, and it was money well spent.

The toast of Plymouth Tar Distilleries, Ltd., was submitted by MR. R. B. CARNEGIE, Devon County Surveyor, and responded to by Mr. L. A. Drapper, a Director, who mentioned that Mr. Ashworth and his colleagues in Cornwall were developing a new technique in tar spraying, in which the firm was helping.

Work began with the acquisition of a site from the Esso Petroleum Company and the removal of many hundreds of tons of rock from what had once been a quarry face. This permitted the erection of the crude tar storage tanks, both of all-welded steel construction and supplied and erected by the Oxley Engineering Company. New concrete roads and rail tracks provide for the reception of crude tar from the numerous South Western Gas Board undertakings in Devon and Cornwall, by road and rail tankers. The tar flows via receiving troughs to a well from which electrically driven rotary pumps deliver it to the main storage tank. Settlement in the latter is followed by transfer to the insulated supply tank where the tar is maintained at a temperature of about 40°C. and then allowed to flow through filters to the feed tank of the distillation plant.

The thought given to the distillation plant covered not only its design but also the architectural features of its housing which conforms to the high standards now existing in the City of Plymouth. The plant selected was a most modern continuous pipe still of design and construction by Proabd (England), Ltd., with a daily capacity of 35,000 gal.

A feature of the pipe still is the thermal efficiency and heat conservation. Opportunity is used to extract heat from the outgoing hot products and waste furnace gases, thereby imparting the heat to the incoming crude tar by means of heat exchangers. Dehydration of the tar is completed by steam heating and it is then pumped through the main heating coil or pipe still. This comprises a cast-iron gilled coil in a brick setting to which heat is supplied by convection from a combustion chamber. Coal tar fuel (C.T.F.300) is employed, the burner being of the steam atomized type of Peabody design.

The tar emerges from the coil at a temperature of about 300°C. and is discharged into a flash chamber where the oils are released in vapour form, leaving a residual product. The vapours pass from the flash chamber to the fractionating column, where they are separated into oils of well defined boiling ranges and from various heights in the column flow as side streams, via rotameters of the magnetic type, to their respective receiving tanks. The lowest boiling fraction or crude benzole leaves the head of the column in vapour form and passes through a water-cooled condenser before reaching its receiver.

LONDON AND SOUTHERN SUMMER MEETING

Traditionally fine 'Institution weather' favoured the summer meeting of the London and Southern Section of the Institution of Gas Engineers on June 21, when members and their ladies relaxed from their normal duties and from the presentation and discussion of technical papers and spent a very pleasant day as the guests of the Eastern Gas Board at Tottenham and further up the Lea Valley. Mr. Eric O. Rose, Divisional Engineer at Totenham, is—or was until July 1—the Chairman of the Section, and it was fitting that the guests should spend the morning looking round the new extensions at the Willoughby Lane works which had been inaugurated a few days earlier by Sir John Stephenson, C.B.E., Chairman of the Board, who, unfortunately, was unable to join the party on 'Rose Day,' but was represented by Mr. J. H. Dyde, the Deputy Chairman.

The guests were entertained to luncheon in a marquee on the lawn at the Sports Club adjoining the works, and speeches were kept to a minimum. Mr. Rose, presiding, called upon his fellow members to drink to the health of Dr. G. E. Foxwell in celebration of the honour of C.B.E. conferred on him in the Queen's Birthday Honours—a distinction well deserved in many ways but more especially in view of the work which Dr. Foxwell had done in connection with the Beaver Committee. The Chairman added a few words in praise of his colleagues at the Willoughby Lane works for their splendid co-operation in the carrying out of the recently opened extensions and for their part in the arrangements for the present gathering. He was pleased to welcome many guests but he said the real guests on the occasion of a summer meeting were the ladies to whom he extended warm greetings.

Mr. J. E. Law, Tottenham Divisional Commercial Manager, made a gallant response for the ladies, hazarding a guess that the reason for selecting him for the task was that in the course of his duties he had to deal with over 200,000 ladies and see that they were satisfied with the service rendered by gas.

After luncheon, motor coach visits were paid to three of the principal nurseries in the area of the Tottenham Division, by kind invitation of members of the Lea Valley Growers' Association. The parties returned to Willoughby Lane for tea, after which Mr. J. M. Webber, Senior Vice-Chairman, expressed thanks to all who had contributed to the success of a very enjoyable day. Finally, Mr. F. T. Brookes, Divisional General Manager, presented Mrs. Rose with a bowl of roses in token of appreciation of the support she had given her husband during that day and throughout his year of office.

Two happy snapshots at Willoughby Lane works on the occasion of the London and Southern Section's summer meeting and ladies' day. On the left are Mr. and Mrs. F. T. Brookes, Mrs. E. O. Rose, and Mr. J. H. Dyde. On the right are Mr. and Mrs. H. Wadsworth, Mr. and Mrs. W. T. J. Gedge, pensioner Mr. Percy Gardiner (former Chief Chemist of the old Tottenham Company), and Mr. E. O. Rose.

The stars of today...

SHEILA SIM who plays Mary Campbell, stenographer-interpreter and the only girl among thirteen passengers and crew on an adventurous flight from Hong Kong to Tokyo in the Ealing Studios Production "THE NIGHT MY NUMBER CAME UP," directed by Leslie Norman.

. . . are created by public acclaim. Cinema audiences acclaim lovely Sheila Sim, who features in the currently released film "The Night my Number came up"—and housewives acclaim the Century Cooker, which features in thousands of modern kitchens throughout the British Isles. The roles of these two stars in contemporary life are in widely differing fields, but the pre-eminence of both is the result of their fulfilling the exacting demands of their respective roles.

Star features of the CENTURY

★ Vitreous enamelled surfaces throughout ★ Cream exterior ★ Removable double platerack ★ Used oven heat vented in front of backplate to heat platerack ★ Four fast-boiling hotplate burners with fixed stop for simmering ★ Large quick-heating grill ★ Safety-type taps ★ Hotplate parts removable ★ Roomy oven—base suitable for slow cooking ★ Mainstat controls oven temperature ★ Drop-type oven door ★ Oven lights from front by flash tube ★ Storage space in plinth ★ Hotplate side extensions and gas lighter supplied if required

R. & A. MAIN LIMITED
LONDON and FALKIRK

C.40

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COOKER

Note the name-made by MAIN

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the NEW water heater for single-point duty . . .

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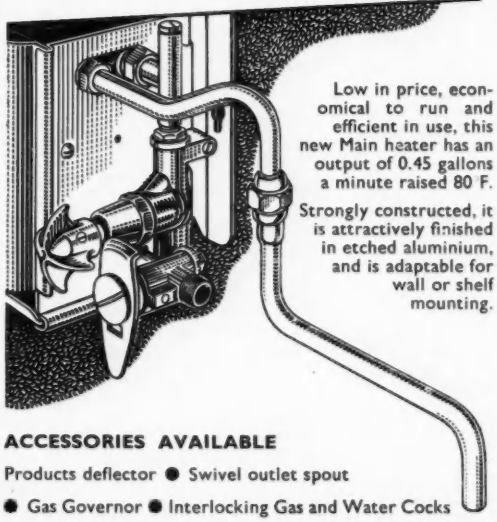
instantaneous
GAS WATER HEATER



Low in price, economical to run and efficient in use, this new Main heater has an output of 0.45 gallons a minute raised 80 F.

Strongly constructed, it is attractively finished in etched aluminium, and is adaptable for wall or shelf mounting.

ACCESSORIES AVAILABLE

Products deflector ● Swivel outlet spout ● Gas Governor ● Interlocking Gas and Water Cocks complete with gas and water throttles and pilot light

low priced to meet popular demand

MAIN WATER HEATERS LTD.
Gothic Works, Thornton Road, Croydon, Surrey

W 34

Oil-fired Boilers—by De La Rue

The name of Potterton, which for nearly a century has been synonymous with all that is efficient and reliable in gas-fired boilers for central heating, will no longer be associated solely with gas. The De La Rue range of Potterton boilers has been extended to include oil-fired boilers with outputs ranging from 108,000 to 216,000 B.Th.U. per hour. By the beginning of the 1955-56 heating season, boilers at 252,000 and 288,000 B.Th.U. per hour should also be available. The boilers will be suitable for blocks of flats, hotels, launderettes and other small commercial and industrial establishments. It is for installations of these types that boilers in the 100,000 to 300,000 B.Th.U. per hour output range are mostly required, and it is in this range that solid fuel boilers converted to oil firing are likely to be least efficient.

Clearly this new development tends to cut across gas industry business, but De La Rue, who will continue to manufacture gas-fired boilers, do not consider either gas or solid fuel as being the main target in their development of oil-fired business. Their attitude was explained by Mr. E. G. Brooks, General Manager of the Gas Division, who, in an interview with the 'GAS JOURNAL,' said: 'We do not foresee this latest project interfering with our sale of gas-fired boilers, which has been built up so carefully over the years. We are concentrating on those people who have decided on oil firing, to ensure that they use the most efficient plant. We consider that this is a particularly rewarding field, for we have proved that it is cheaper for such people to buy a new installation instead of clinging to their old solid fuel boiler and buying a conversion unit. For example, in a small hotel (20 to 30 bedrooms) using a 216,000 B.Th.U. per hour boiler, the annual consumption might be 3,700 gal. costing £222 with a Potterton boiler at 78% efficiency; but with a conversion job at 55% efficiency the consumption would be as much as 5,250 gal. costing £314. In other words, the additional cost of getting a good-looking installation would be saved in 18 months, and the saving at £92 per year would continue thereafter as sheer profit.'

It is clear from Mr. Brooks' remarks that the gas industry need not be unduly apprehensive concerning the aims of his Company, but the implication was obvious when he said that 'New gas business is being lost in many places because of unfavourable tariffs. If the gas industry can apply special tariffs for bulk hot water supply, it can still compete position for this type of load.'

The oil-fired boiler will be on view to architects and heating engineers during July, as follows: Birmingham Exchange and Engineering Centre, Stephenson Place, Birmingham, July 12; Engineers' Club, Manchester, July 13; Royal Hotel, Bristol, July 14, from 5 p.m. to 6 p.m. in each instance. Mr. Brooks will be present to describe the boiler and answer any queries.

Fires and Explosions

Members of a new committee on industrial fires and explosions include Mr. R. F. Hayman, Industrial Gas Officer of the Gas Council, and Dr. W. A. Simmonds, of the Gas Council's Midlands Research Station. They are serving on this committee entirely in a personal capacity and not as representatives of the Gas Council or any other organization.

The committee has been set up by the Fire Research Board of the Department of Scientific and Industrial Research and the Fire Offices Committee. The Chairman is Professor A. R. Ubbelohde of the Imperial College of Science and Technology, and the Secretary, Dr. D. J. Rasbash of the Fire Research Station, Boreham Wood.

The terms of reference of the Committee are: (1) to study industrial hazards which arise from the flammability of certain dusts, vapours and gases; and (2) to advise on a research programme to provide information that will enable industry and other bodies to avoid, or reduce the effects of, these hazards.

Scottish River Pollution

The Scottish Gas Board was fined £20 at Stirling Sheriff Court when it admitted having polluted the River Forth at Stirling. A previous conviction was recorded in 1952, when the fine imposed was £30.

The Fiscal stated that on March 23 an official of the Forth District Salmon Fishery Board observed a tarry substance coming from the town's main sewer to the river. This was eventually traced to the Scottish Gas Board's premises at Stirling. There had been frequent complaints from net fishermen using the Forth that their nets were being spoiled by the tarry substance, which was also dangerous to fish life.

An agent representing the Board said that when the matter was reported a technical officer visited Stirling and made an investigation. He reported that the system was working perfectly. Only after further investigation was it discovered that an employee responsible for the filter system had turned a valve on too far, with the result that the system was overloaded. The Board now hoped to eliminate the human element by putting in an automatic valve.

Highlight of the Conference of the National Union of Townswomen's Guilds at Edinburgh was a 'brains trust' panel of smokeless fuel experts. The Chairman of the panel was Mr. A. G. Ludgater, Manager of the Solid Smokeless Fuels Federation. The other members were Mrs. John Campbell, Women's Advisory Council on Solid Fuel; Mr. John Innes, National Smoke Abatement Society; Mr. G. E. Hall, British Coking Industries Association; Mr. R. H. Bone and Mr. H. S. Hughes, Scottish Gas Board; and Mr. J. W. Moule, South of Scotland Electricity Board.

Profit at Bangor

Before vacating the chair at the annual meeting of Bangor (Co. Down) Borough Council the Mayor, Councillor David Ewart (who was re-elected) reviewed affairs in the Borough. Referring to the Gas Department, he recalled that it celebrated its centenary towards the end of last year. Consumption during the past year, he said, exceeded that for the previous year, and though the cost of coal had increased by £5,000 and wages and salaries by £3,000, a substantial profit would be shown in the next accounts, notwithstanding the fact that the price of gas had not been altered for over three years.

This reflected great credit on the Manager (Mr. J. A. Derbyshire) and his staff, and was even more creditable when it was borne in mind that the price in Bangor was less than in any other town in Northern Ireland, and was one of the lowest in the United Kingdom.

During the past year 266 premises were connected to gas mains and 429 cookers sold. Sales of gas appliances amounted to £21,000, an increase of £3,300 over the sales in the previous year. Stocks of coal created a good deal of uneasiness. On one occasion there was only sufficient for 36 hours. However, the matter had been energetically pursued, and it was hoped to ensure an adequate supply at all times.

Coal Transport in Scotland

Officials in Scotland are giving serious attention to the experience over the period of the rail strike, with particular regard to the possibility of continuing road transportation in place of rail. The experience of road handling was so satisfactory in many cases that managements are anxious to maintain the service operating during the strike. About 45% of the Scottish coal production was moved to gasworks, electricity stations, steelworks, and industrial plants by road, the lorries running in on improvised ramps, loading fast, and turning round fast. Costs were in many cases very much under rail, more especially where the location of the consuming point prevents direct rail access. In such cases the rail depot to the consumption point, manhandled out into trucks, with or without mechanical aids and delivered by road to the consuming point.

Experience over the strike period showed that the complete colliery to consumption point road haulage cost was often lower than the similar cost from the rail depot to the consumption point, showing a clear saving of the rail freight charge from the colliery to the distribution point. Many plants are organized on a rail transport basis with direct access sidings, and in such cases rail transportation had advantages because of the bulk it permits, but there are other points where the same advantages do not apply and where more attention might be given to road haulage because of its economy. The situation is being investigated. It would mean alterations at the colliery to allow direct loading into vehicles, and much would depend on the rates applying.

REWARDS FOR BRIGHT IDEAS

Mr. R. E. Johnson with some of those who submitted successful suggestions. (Left to right) A. W. Banfill, L. E. Legate, H. W. Nichols, D. Worboys, L. M. B. Norbert, O. J. Gamm, the Deputy Chairman, A. G. Mellowship, and J. H. Arnold (Secretary, Suggestion Scheme Committee).

The Deputy Chairman, Mr. R. S. Johnson, presented the first cheques to be awarded under the South Eastern Gas Board's suggestion scheme at Croydon recently. 'We certainly do need all the bright ideas anybody can think of now,' he said, 'with the industry passing through a highly competitive phase.' He said that the present scheme had sprung from joint consultation, and he welcomed representatives of Consultative Committees who were present. The Board considered that the suggestion scheme could form a real inducement to employees to bring forward ideas that could be of help in improving efficiency and service to the public, he added. Seven out of the first 31 suggestions submitted won awards.

Successful ideas included a lighting device for balanced-flue gas appliances, and an ingenious contrivance for protecting tne operators of mechanical producers from fumes. Our picture shows Mr. Johnson discussing a suggestion with the seven award winners.

American Gas Sales Up

The monthly *Bulletin of Utility Gas Sales*, published by the American Gas Association, states that total gas sales of the gas utility and pipeline industry to ultimate consumers during April, aggregated 5,862 mill. therms, an increase of 12.1% compared with sales of 5,227 mill. therms in April of last year. The increase was primarily attributable to a gain of approximately 16.1% in the industrial use of gas. This more than offset the lower househeating demand per customer, due to milder weather experienced throughout most sections of the country. Industrial activity as measured by the Federal Reserve Board index continues to reflect the broad economic recovery which has taken place since the middle of last year. The index reached 136 (1947-49 = 100), or 10.6% over April of a year ago. The Association's April index of utility and pipeline sales is 195.5 (1947-49 = 100).

Utility and pipeline sales of natural gas to ultimate consumers in April totalled 5,530 mill. therms, a gain of 12.8% over the 4,902 mill. therms sold in April of last year. Total manufactured and mixed gas sales increased 2.2% from 324.9 mill. to 332.1 mill. therms. Sales of mixed gas were up 10.9% to a total of 284.9 mill. therms. During the same period, sales of manufactured gas declined 30.5% from 67.9 mill. to 47.2 mill. therms. The continuing decline in manufactured gas sales reflects, to a large extent, conversions from the distribution of manufactured to natural and mixed gas.

Current sales figures therefore represent sales of fewer manufactured gas companies than do those of a year ago. The percentage change in sales, however, measures the decrease in actual quantities of manufactured gas distributed in the current period as compared with the like month a year ago.

During the 12 months ended April 30, 1955, total utility and pipeline sales of gas aggregated 64,143 mill. therms, 9.8% over the 58,442 mill. therms consumed in the 12 months ended April 30, 1954.

Natural gas sales totalled 60,753 mill. therms, a gain of 10%, while sales of manufactured and mixed gas increased from 3,236 mill. therms during the 12 months ended April 30, 1954, to a total of 3,390 mill. therms in the current cumulative 12 month period.

London Juniors Ladies' Day

Saturday, June 25, was a memorable day for the London and Southern Junior Gas Association and for the Watson House laboratories of the Gas Council, since it marked the first-ever visit of the Association's members with their ladies to the centre and also the first visit for 10 years of the Association itself. As befitted such a special occasion, the number of ladies and members present was very high and the weather left nothing to be desired.

After the reception by the Association's President, Mr. E. W. B. Dunning, in the Watson House Exhibition, the laboratories were thrown open to general inspection, organized parties being arranged for the ladies, while the menfolk were free to devote their attentions where they pleased, according to their interests. It was clear from the animated conversations which took place wherever the conducted parties halted, that the ladies were profoundly interested in all that they saw, especially in the cooker laboratory and the test kitchen, where they were obviously in their element. The new laboratories at Watson House —*i.e.*, the coke, industrial, large equipment and aerodynamics laboratories, were on view on this occasion and from an inspection of them, it could be appreciated that the additional facilities made available most prove of immense value to the work of Watson House.

Luncheon was served in the main canteen at Watson House and a warm tribute must be paid to the canteen staff who provided a truly wonderful meal. Mr. Michael Milne-Watson, Chairman of the North Thames Gas Board, proposed the toast of the Association and the guests, and made mention of the historic nature of the site on which Watson House is situated and told how, in years past, it was the centre of a flourishing market garden area, and how the staff of the old Imperial Gas Light and Coke Company, the predecessor of the Gas Light and Coke Company, had to contend with the depredations of the gipsies who lived where Watson House now stands.

In his reply for the Association, Mr. Dunning thanked Mr. Milne-Watson and the North Thames Gas Board for throwing open the laboratories and for its hospitality in arranging the luncheon and the afternoon visit to Wisley, which was to follow. Mr. Dunning referred to the fact that the Association is particularly fortunate in that its members are drawn from four gas boards and that, in consequence, a variety of points of view were put forward at the meetings and in the papers. This was a good thing for the Association, whose members had given stalwart support to him during his presidential year.

Members and their ladies then proceeded to the Royal Horticultural Society's gardens at Wisley

The Order in Council transferring to the Board of Trade the functions of the Minister of Supply in relation to iron and steel comes into force on July 18.

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Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/- per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

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MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* Kings Norton 3868

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18–64 inclusive or a woman aged 18–59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

EAST MIDLANDS GAS BOARD

SHEFFIELD & ROTHERHAM DIVISION
APPOINTMENT OF SENIOR CHEMIST

APPLICATIONS are invited from suitably qualified persons for the appointment of a SENIOR CHEMIST in the Central Laboratory at Sheffield.

The salary will be in accordance with Grade A.P.T. 9 of the National Salary Scales (£700 to £800).

Candidates should possess suitable academic qualifications and have had experience in the carrying out of routine testing, including the analysis of coal, oil and gas. Applicants may also be required to undertake special investigations.

The successful candidate will be responsible for the supervision of the Central Laboratory during the absence of the Divisional Chemist.

The position is pensionable and the successful candidate may be required to pass a medical examination.

Applications, giving details of age, education, qualifications, experience, etc., together with the names of two referees, should be addressed to reach the undersigned not later than July 15, 1955.

CHAS. C. WOOD,
Divisional General Manager.

Commercial Street,
Sheffield, 1.
June 20, 1955.

EASTERN GAS BOARD

WATFORD DIVISION
CHEMICAL STAFF APPOINTMENTS

APPLICATIONS are invited for the following appointments:—

1. Works Chemist, St. Albans.
2. Assistant Works Chemist, St. Albans.
3. Assistant Works Chemist, Luton.

Candidates should have some practical experience, not necessarily in the Gas Industry, and commencing salary will be within the range £385 to £665 (Grades A.P.T. 4, 5 or 6) for Assistant Works Chemist and within the range £585 to £760 (Grades A.P.T. 6, 7 or 8) for Works Chemist. An approved qualification will command a higher commencing salary in the Division's grading scheme for chemical staffs.

Training will be given to successful applicants who have no previous experience in the Gas Industry and facilities will be given in approved cases to those desirous of proceeding to higher professional qualifications. There are excellent prospects for advancement in the Industry generally and in particular in this Division, where expansion of business demands an increasing number of technicians in process and specialist departments.

The persons appointed may be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Write to the Divisional General Manager, Eastern Gas Board, Radiant House, Clarendon Road, Watford, giving age and full details of education and experience, not later than July 11, 1955.

NORTHERN GAS BOARD

WESTERN GROUP
MECHANICAL ENGINEER
CARLISLE DIVISION

APPLICATIONS are invited for the position of MECHANICAL ENGINEER on the staff of the Carlisle Division.

Salary within Grade APT. 9 (£700-£800 per annum), placing according to age and experience.

The successful candidate will be required to pass a medical examination and join the Board's Staff Pension Scheme.

Applications stating age, experience and giving full details of training and qualifications, together with the names of two referees, should be addressed to The Divisional General Manager, Gas Works, Rome Street, Carlisle, to arrive not later than Saturday, July 2, 1955.

A. R. CROFT,
Group General Manager.

50, Castle Street,
Carlisle.
13.6.55.

NORTHERN GAS BOARD

SUNDERLAND DIVISION
SUNDERLAND UNIT

APPLICATIONS are invited for the following vacancies.

SENIOR CHEMIST, Hendon Works, Sunderland.

Candidates should be suitably qualified to undertake full responsibility under the Works Manager for supervision of Chemical Staff, routine testing and control of sections of the Works Plant.

The appointment will be within A.P.T. Grade 9 (£700/£800), of the National Salary Scales for Gas Staffs.

ASSISTANT DISTRIBUTION SUPERINTENDENT, Hind Street Distribution Department, Sunderland.

Candidates must have knowledge of all aspects of modern distribution practice, general administration of a Distribution Department and practical experience of main and service laying, both high and low pressure, gasfitting, public lighting and the control of employees.

The possession of the Higher Grade Certificate in Gas Engineering (Supply) would be advantageous.

The commencing salary will be within A.P.T. Grade 10 (£760/£860) of the National Salary Scales for Gas Staffs.

TECHNICAL ASSISTANT, Hendon Works, Sunderland.

Candidates should be conversant with Gas Works Plant or Coke Oven practice and be familiar with routine laboratory tests.

The commencing salary will be within A.P.T. Grade 6 (£565/£645) of the National Salary Scales for Gas Staffs, on an appropriate step according to experience.

The successful candidates will be required to pass a medical examination and will be subject to the Board's Pension Scheme.

Applications stating age, experience, qualifications and giving the names of two referees should be addressed to the undersigned within 14 days of this advertisement.

W. O KIRKWOOD,
Divisional General Manager.

P.O. Box No. 39,
Fawcett Street,
Sunderland.
June 20, 1955.

(Classified advertisements continued on page 928)

APPOINTMENTS VACANT (ctd.)

INDUSTRIAL MAINTENANCE ENGINEER required for Natural Gas undertaking in WEST PAKISTAN. Applicants must have practical experience in the construction, operation, etc., of all types of Industrial and Commercial plant where gas and other forms of fuel are utilized and should be capable of carrying out adjustment and maintenance of burners and controls and of supervising and training native fitters. Attractive salary, 3 year contract and other benefits. Write with details of qualifications and experience to Box G.J.653, c/o, 191, Gresham House, E.C.2.

SALES AND SERVICE ENGINEER required for Natural Gas undertaking in WEST PAKISTAN. Applicants must be qualified Industrial Gas Engineers and have full knowledge of the utilization of gas and other fuels in Industrial and Commercial establishments together with wide experience of the design, development and operation of Industrial and Commercial gas burner equipment, including controls. Attractive salary, 3 year contract and other benefits. Write with details of qualifications and experience to Box G.J.652, c/o, 191, Gresham House, E.C.2.

TWO FIRST CLASS FITTERS urgently required—must be single men. Full J.I.C. Rates (Provincial "A" and Conditions of Service).

The successful candidates may be required to pass a medical examination.

Accommodation can be arranged.

Applications, giving details of age, present duties and references, should be made to the undersigned within two weeks of the appearance of this advertisement.

F. N. Howes, Group Manager, Eastern Gas Board —Ipswich Division, Gas Works, Chelmsford, Essex.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
DRAUGHTSMAN—DIVISIONAL ENGINEER'S OFFICE

APPLICATIONS are invited for the above position in the Divisional Engineer's Drawing Office at Foundry Lane, Smethwick.

Candidates must be competent to prepare drawings, specifications and estimates for the design and layout of gasworks and gas distribution plant or similar equipment.

The salary for the post will be within Grade 9 (£700-£800 per annum) of the National Salary Scales.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, education, qualifications and experience, together with the names of two referees, should be addressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

SOUTHERN GAS BOARD

PORTSMOUTH, GOSPORT AND BOGNOR-REGIS GAS UNDERTAKING.
TECHNICAL ASSISTANT—DISTRIBUTION

APPLICATIONS are invited for the above post in the Distribution Department of the above Undertaking.

Candidates should be experienced in high and low pressure gas distribution practice together with the preparation of specifications, drawings, and estimates for distribution work. Considerable extensions, including bulk integration are taking place. The possession of a technical qualification in gas distribution would be an advantage.

The commencing salary will be within Grades APT V and VI (£530-£645) per annum on an appropriate step according to experience.

The successful candidate will be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme.

Applications stating age, qualifications and experience together with the names of two referees should be addressed to the undersigned to reach him not later than July 21, 1955.

H. M. LAWRENCE,
Engineer and General Manager.

Gas Offices,
The Square,

A LEADING firm of Manufacturers require DEPARTMENTAL MANAGER for their Portable Appliance and Brass Gas Fittings section. Applicants must have good commercial knowledge, organising ability and initiative, and be responsible for development of sales. Good salary for the right applicant, who must be over 35 years of age. Apply: No. 245, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WEST MIDLANDS GAS BOARD

BIRMINGHAM AND DISTRICT DIVISION
ADMINISTRATIVE ASSISTANT
TO
DIVISIONAL ENGINEER

APPLICATIONS are invited for the above position at the Divisional Engineer's Headquarters, located at Saltley Works, Birmingham.

Candidates should have had considerable experience in secretarial duties, committee work, general administration and supervision of clerical staff.

The salary for the position will be in accordance with Grade A.P.T.12 (£835-£960 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications, particulars of training and experience and present salary, together with the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Gas Offices, Edmund Street, Birmingham, 3, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

BIRMINGHAM AND DISTRICT DIVISION
ASSISTANT CONSTRUCTIONAL ENGINEER

APPLICATIONS are invited for the above position on the Divisional Engineer's Staff, at Saltley Works, Birmingham.

Candidates must have had good drawing office training and experience, including the layout of all types of gas works plant, the preparation of specifications and estimates and the general supervision of contracts on site. They must also have had some experience of building contracts, including reinforced concrete work.

Experience with gas works contractors will be an advantage.

The salary will be within the salary range £950-£1,100.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications, and particulars of training and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

BIRMINGHAM AND DISTRICT DIVISION
ASSISTANT ENGINEER
NECHELLS WORKS, BIRMINGHAM

APPLICATIONS are invited for the position of ASSISTANT ENGINEER at the Nechells Works which produces 40 million cu. ft. per day, and is shortly to be augmented to 52 million. The position is interchangeable with parallel posts at other Works of the Birmingham District and transfers may be made from time to time.

The duties will entail full responsibility for the operation of large installations of carbonising and/or carburetted water gas plants under the jurisdiction of the Engineer and Works Manager, and his Deputy.

Candidates should have had extensive experience in the operation of continuous vertical retorts, and automatic carburetted water gas plants, and in the control of staff and labour. Corporate Membership of the Institution of Gas Engineers is an essential qualification and the possession of an Engineering Degree or a Gas Engineering Diploma will be an advantage.

The salary will be £1,000 rising by annual increments of £50 to £1,100 per annum.

A modern flat will be available at a reasonable rent.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications, and particulars of training and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

BIRMINGHAM AND DISTRICT DIVISION
DRAUGHTSMAN, DIVISIONAL ENGINEER'S OFFICE, SALTLEY, BIRMINGHAM

CANDIDATES should hold a Higher National Certificate in Civil and Mechanical Engineering or equivalent qualification, and have had considerable experience in an Engineering Drawing Office, including plant layout. A knowledge of Gas Works plant will be an advantage but is not essential.

The salary will be within Grade 8 (£660-£740 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, experience and qualifications, together with the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Birmingham and District Division, Gas Offices, Edmund Street, Birmingham, 3, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

EXPERIENCED Contractor's Agent required. Permanency; for supervision of Gas and Water Mainlaying Contracts. Home Counties. Accommodation. State age, salary, full experience. Apply No. 243, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

FORD MOTOR COMPANY, LIMITED, of Dagenham, Essex, are making industrial history again. We have a vast expansion scheme under way which has created the following opportunity in our Construction Engineering Department.

An Assistant Engineer is required for project work on Gas Holders, Boiler Installations and general engineering. To qualify for this job you will need an A.M.I.Mech.E. backed by at least five years' experience of site erection and supervision.

Does this opening appeal to you? Then our Salaried Personnel Department will be glad if you will write to them. Your starting salary will reflect your experience and qualifications and our excellent non-contributory pension will take care of your future security. Please quote reference KGA.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited from suitably qualified persons for the following pensionable appointments:—

WIRRAL GROUP

ASSISTANT ENGINEER (INDUSTRIAL GAS)
(Salary within Grade A.P.T. 8—£660/£740 per annum).

Applicants should have had experience in the installation and operation of industrial gas appliances and should possess a Higher Grade Certificate in Gas Engineering (Supply), Mechanical Engineering, Chemistry or an equivalent qualification.

TECHNICAL ASSISTANTS (PRODUCTION)
Salaries within Grade A.P.T. 7—£620/£700 per annum).

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B., Wirral Group, Hind Street, Birkenhead, within 14 days.

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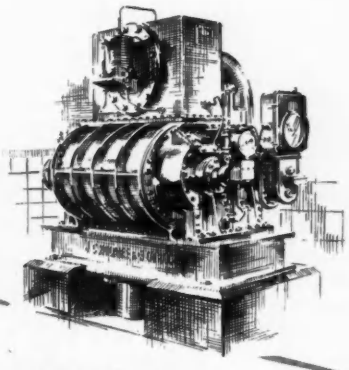

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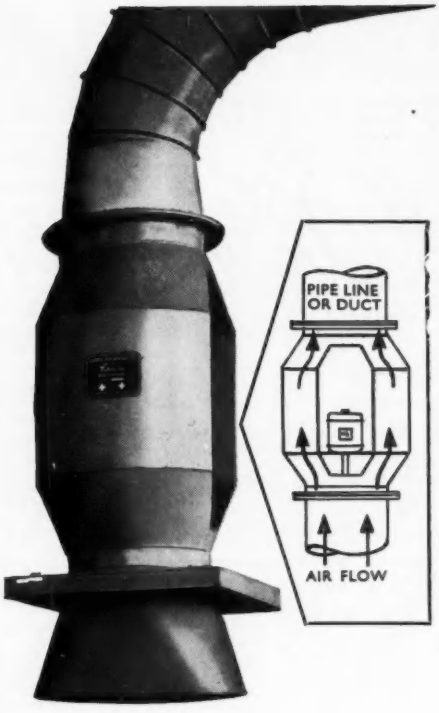

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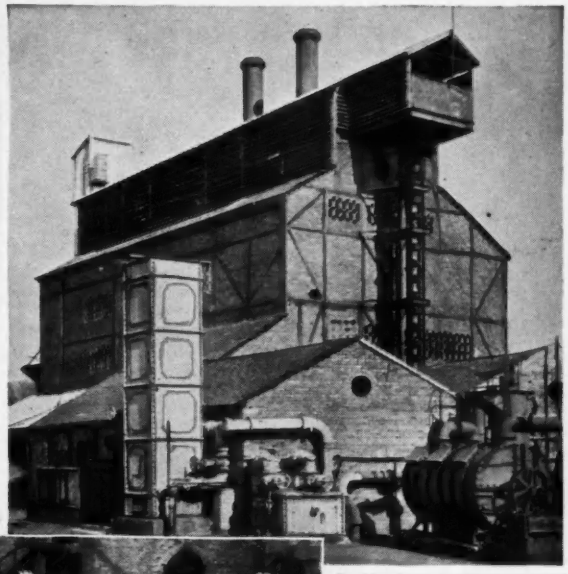

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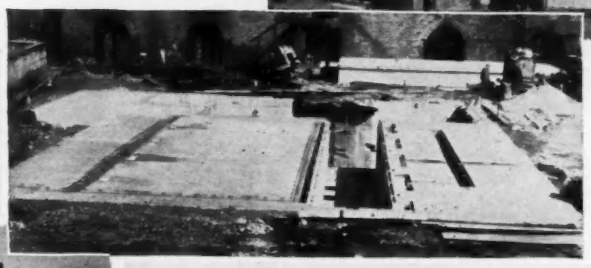

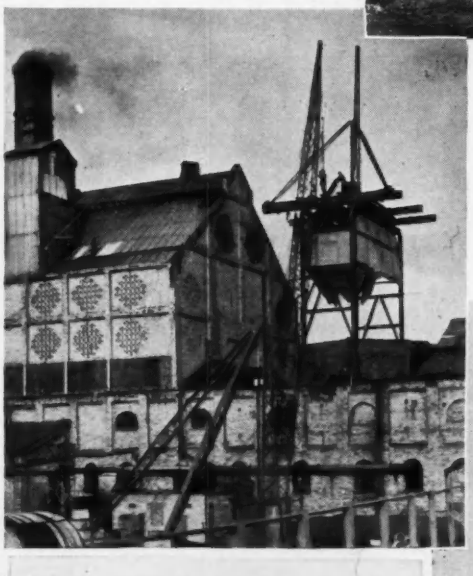

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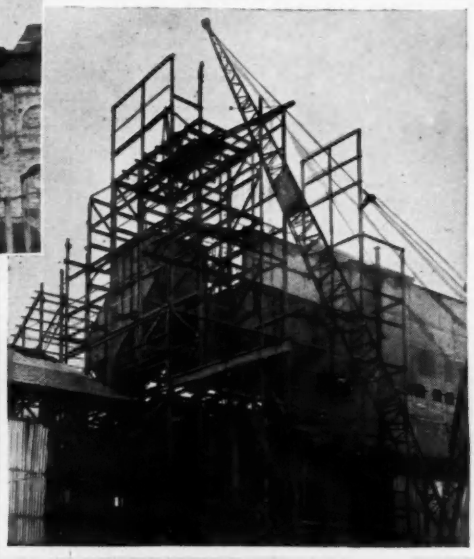

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